CONTRACT DOCUMENTS
FOR THE CONSTRUCTION OF

2023 COMMUNITY CENTER PARKING LOT AND KITCHEN REMODEL PROJECT

FOR THE

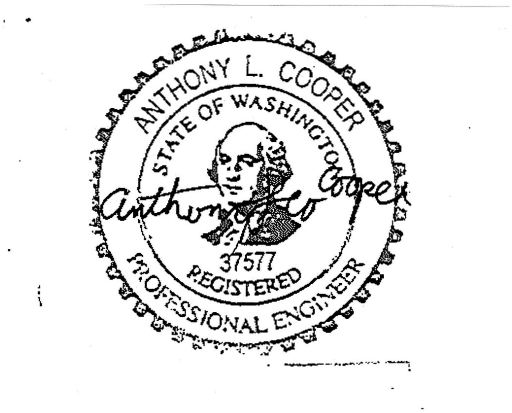
CITY OF LA CENTER

November 10, 2022

LA CENTER JOB NUMBER: PW 2023-01

Prepared By:

Collins Architecture and
Tony Cooper, PE
City of La Center
City Engineer
210 E. 4th Street
La Center, WA 98629
(360) 263-7665



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INVITATION TO BID

2023 COMMUNITY CENTER PW 2023-01

Sealed proposals for furnishing all materials, labor and equipment for the following described work will be received by the City of La Center Community Development Office by January 10th, **2023 at 3 PM**. **Bids will only be allowed to be submitted at City Hall at 210 E. 4th Street in La Center. The bids will only be accepted 8AM and 3PM up to the day the bids.** For any questions about submittal of the bids call Tony Cooper at 360 263-2889 or by email at acooper@ci.lacenter.wa.us. The proposal shall be enclosed in envelope addressed to the City of La Center at 210 East 4th Street, City Hall, La Center, WA. 98629. Electronic Bids will not be accepted. The public bid opening will occur at 3PM on January 10th, 2023. The City Hall at 210 East 4th Street in La Center);
A contract will be awarded or all bids rejected within 45 days after the bid opening.

PROJECT NAME: **2023 COMMUNITY CENTER PARKING LOT AND KITCHEN REMODEL PROJECT** PW 2023-01

PROJECT DESCRIPTION:
The first part of the project consists of a kitchen remodel.
In the kitchen, a new commercial hood for a gas grill and range will be added, with a fire suppression system, and replacing the existing appliances with commercial appliances.

The second part of the project consists of reconstruction of portions of the parking lot drive aisle that has failing subgrade and pavement. Paving of the entire drive aisle shall be completed following reconstruction of the failing areas.

The issuing office for Contract Documents is City of La Center Community Development, 210 East 4th Street,
La Center, WA 98629. Plans will be available starting November 16th, 2022. Electronic copies are available through the City of La Center Plan Site on the on the City Website for download. Any addendums to the project bid will also be published on the city website. The contractor will need to check the website for any posting of addendums or bidding information.

Technical inquiries regarding the project should be directed to Tony Cooper, City Engineer, at City of La Center Community Development for the paving project and the kitchen remodel, at La Center, WA 98629, (360) 263-2889 for by email acooper@ci.lacenter.wa.us, All proposals must be submitted on the regular form furnished with the specifications, and each must be accompanied by a certified or bank check or bidder's bond, by a bonding company licensed to do business in the State of Washington, made payable to the City of La Center in an amount not less than five percent (5%) of the total bid. Work for the kitchen remodel shall be completed between February 15th to May 12th of 2023 within **63** working days after receipt of Notice to Proceed. **The contract time working days may be suspended for ordering and delivery of the kitchen hood, or other materials on the project that could impact the schedule**. Work for the parking lot portion of the project, shall be completed between June 1st, 2023 and September 7th 2023 within **70** working days. Any adjustment of this schedule shall be approved by the city.

State of Washington Prevailing Wage is applicable to this work.

This project will include sales tax in each bid item as described below.

State Sales Taxes -- the provisions of Section 1-07.2(1)-Rule 170 – apply to this project. The Contractor shall collect from the agency Washington State Retail Sales Taxes on the full contract price. The contracting agency will automatically add **Retail Sales Tax** to each payment

All construction and material, unless otherwise specified, shall be in accordance with the 2022 Standard Specifications and Standard Plans for Road, Bridge and Municipal Construction as prepared by the Washington State Department of Transportation and as amended under Amendments to the Standard Specifications, and the American Public Works Association, and the City of La Center Engineering Standards for Construction.

The CITY OF LA CENTER reserves the right to cancel this request or reject any and all bids received or to waive any minor formalities of this call if in the judgment of the City Council the best interest of the City would be served.

PART I- BIDDING DOCUMENTS

INSTRUCTIONS TO BIDDERS

1. Intent of Plans and Specifications

It is the intention of these specifications to provide for careful, thorough and workmanlike construction procedures in the installation of materials and equipment and in the manufacture and delivery of such materials and equipment. The bidder to whom the contract is awarded shall furnish all the material and labor necessary to complete said contract in accordance with all of its terms and conditions.

The plans and specifications shall be considered and used together. Anything appearing as a requirement of either shall be accepted as applicable to both even though not so stated therein or shown. The Engineer may furnish supplemental plans and specifications to define more clearly any requirement of the original documents; these shall be accepted by the Contractor as of the same force and effect as though they had been included among the listed drawings and in case of any conflict between the listed and the supplemental drawings, the latter shall govern. The Contractor shall not be entitled to extra payment because of his compliance with the requirements of such supplemental drawings unless they contain new requirements involving costs which clearly could not have been anticipated by an experienced contractor in his examination of the original listed drawings or could not reasonably be inferred there from the requirements of the contract.

All specifications and notes appearing on the plans shall have the same force and effect as though they were repeated herein and by this reference are incorporated herein and made a part hereof.

2. Examination of the Contract Documents

Each bidder shall thoroughly examine and be familiar with legal and procedural documents, general conditions, special provisions, specifications, drawings and addenda (if any). The submission of a proposal shall constitute an acknowledgment that the bidder has thoroughly examined and is familiar with the contract documents. The failure or neglect of a bidder to receive or examine any of the contract documents shall in no way relieve him from any obligations with respect to his proposal or to the contract. No claim for additional compensation will be allowed which is based upon a lack of knowledge of any contract document, and the Owner will in no case be responsible for any loss or for unanticipated costs that may be suffered by the Contractor as a result of conditions pertaining to the work.

3. Examination of Site and Conditions

Before making a proposal, the bidder shall examine the site of the work and ascertain for himself all the physical conditions in relation thereto. Failure to take this precaution shall not release him from his obligation as implied by the proposal he submits nor excuse him from performing the work in strict accordance with the requirements of the contract documents.

No statement made by any officer, agent, or employee of the Owner pertaining to the site of the work or the conditions under which the work must be performed will be binding on the Owner.

4. Inclement Weather

The City of La Center is subject to inclement weather through the winter and spring months. Severe rain and wind storms may occur in addition to snow and ice. The Contractor should be aware of the potential for inclement weather and plan the project accordingly.

5. Addenda and Interpretations of Documents

No interpretation of meaning of the plans, specifications or other pre-bid documents will be made to any bidder orally. Every request for such interpretation shall be submitted in writing, addressed to City of La Center, and to be given consideration, shall be received at least five working days prior to date fixed for opening bids. Any and all such interpretations and any supplemental instructions will be in the form of written addenda to the specifications which, if issued, will be mailed, faxed or otherwise delivered to each prospective bidder. Failure of any bidder to receive any such addendum shall not relieve such bidder from any obligation under his bid as submitted. All addenda so issued shall become a part of the contract documents. Where changes to plans, specifications or both or supplemental information of significant importance, additional bid time will be provided.

6. Preparation of Proposal

Bids must be submitted by filling in with ink (or typing), on the Form headed "Bid Proposal," each and every blank on each schedule for which the bidder has submitted a proposal. If the bidder is required to provide a special form appropriate to the nature of his bid, then such form shall be complete in all respects as required by the specifications if it is to merit consideration by the Owner.

All bid prices must be equal to the Bidders estimated cost to perform the work. Prices which are weighted and disproportionate to the actual cost, as may be compared to other Bidders and evaluation by the Engineer, may be considered non-responsive and their bid rejected. If the proposal is made by a partnership, it should contain the name of each partner and should be signed in the firm name, followed by the signature of partner or that of a person duly authorized to act for and on behalf of such partnership. If made by a corporation, the proposal should be signed with the name of the corporation and the state in which incorporated, followed by the written signature of the qualified officer and the designation of the office he holds in the corporation. The address of the person, firm or corporation in whose behalf the proposal is submitted shall be given. The bidder shall comply with all other specific requirements of the proposal form.

7. Alteration of Documents Prohibit

Except as may be provided otherwise herein, proposals which are incomplete, are conditioned in any way which the plans or specifications do not authorize, contain unverified erasures or alterations, include items which are not named in the proposal form or which are unlawful, may be rejected as non-responsive.

8. Submission of Proposal

Each proposal shall be completely sealed in a package addressed as required by the Invitation to Bid, marked with the name of the bidder and the title of the project, and must be delivered to La Center City Hall Office at 210 East 4th Street, La Center, WA. 98629 at the City Hall, January 10th 2023 before 3 P.M.

9. Modification of Proposal

Change in a proposal already delivered will be permitted only if a request for the privilege of making such modification is made in writing signed by the bidder and the specific modification itself is stated prior to the scheduled closing time for the receipt of proposals. To be effective, every modification must be made in writing over the signature of the bidder; no other form of procedure will be accepted.

10. Substitutions

Approval of materials to be used on the project and possible substitutions thereof shall not be addressed during the bidding process. Materials shall meet the specifications and the bids shall be based on specified items.

11. Bid Security

Each bid must be accompanied by cash, certified check of the bidder, or a bid bond duly executed by the bidder as principal and having as surety thereon a surety company authorized to issue bonds in Washington in the amount of 5% of the bid. Such cash, checks or bid bonds will be returned promptly after the Owner and the accepted bidders have executed the contract, or, if no award has been made within forty-five (45) days after the date of the opening of bids, upon demand of the bidder at any time thereafter, so long as he has not been notified of the acceptance of his bid. The successful bidder, upon his failure or refusal to execute and deliver the contract, bonds and certificates of insurance required within ten (10) calendar days after he has received notice of the acceptance of his bid, shall forfeit to the Owner, as liquidated damages for such failure or refusal, the security deposited with his bid. Attorney-in-fact who signs bid bonds or contract bonds must file with each bond a certified and effectively dated copy of their power of attorney.

12. Withdrawal of Proposal

A proposal may be withdrawn at any time prior to the scheduled closing time for filing bids. This may be done by the bidder in person or upon his telegraphic or written request. A telephone request for withdrawal of a proposal will not be recognized for this purpose. If withdrawal is made personal, a written acknowledgment thereof will be required. After the scheduled closing time for filing bids, no bidder will be permitted to withdraw his proposal unless no award of contract has been made prior to the expiration of forty-five (45) days immediately following the time when bids are submitted. Bids received after the scheduled closing time will be returned to the bidder unopened.

13. Opening Bids

All bid proposals received prior to the scheduled closing time and which are not withdrawn as above provided, will be publicly opened and read aloud even though there may be irregularities or informalities therein, except that any form required as part of the proposal (see Bidder's Checklist below) which is not signed, said proposal will not be read and consequently, will be rejected without consideration.

14. Award of Contract

Within forty-five (45) calendar days after the opening of the proposals, the Owner will accept one or more of the proposals or reject one or more bids for good cause. Performance and Payment Bonds in the amount of one-hundred percent of the contract price, with a Corporate Surety approved by the Owner, will be required for the faithful performance of the contract. The bond forms contained in the

contract documents must be utilized. In addition, all contractual forms contained in the Contract Documents will be required for the faithful performance of the contract.

15. Basis of Award

If the owner awards the contract, the award will be given to the lowest responsive, responsible, qualified Bidder submitting the lowest Bid Proposal acceptable to the Owner. The base bid will be Schedule A and Schedule B, will be used as the basis of bid. The city reserves the right to select one or both of the alternatives in the bid proposal.

16. Rejection of Bids

The Owner reserves the right before or after opening to reject any or all bids or to waive any informality therein if it is believed that the best interest of the Owner will be served thereby.

17. Soils Investigations

No Geotechnical Report was completed for the City of La Center portion of work. The bidder is responsible for conducting his own subsurface investigations, if he deems it prudent or necessary.

18. Bidder's Risk

The submission of bid shall constitute an acknowledgment that the bidder has thoroughly examined and is familiar with the contract documents, and has reviewed and inspected all applicable statutes, regulations, ordinances and resolutions dealing with or related to the service to be provided herein. The failure or neglect of a bidder to examine such documents, statutes, regulations, ordinances or resolutions shall in no way relieve the bidder from any obligations with respect to the bidder's bid or to the contract. No claim for additional compensation will be allowed which is based upon a lack of knowledge of any contract documents, statutes, regulations, ordinances or resolutions.

19. Bidder's Checklist

Bidder shall complete the following forms and shall submit them with the Bid Proposal:

Bid Instruction Pages Form
Bid Proposal Form
Non-Collusion Affidavit
Bid Bond
Bidder Qualifications

BID INSTRUCTION PAGES FORM

All contractors doing business within the City of La Center are required to have (or obtain) a City of La Center business license. For information, call (360) 263-2782.

Wage Law Intents and Affidavits

If awarded the project, the contractor and each subcontractor shall complete or have on file a current "Statement of Intent to Pay Prevailing Wages" (Form L&I Number F700-029-000) before payment will be made for work performed. An "Affidavit of Wages Paid" (Form L&I Number F700-007-000) shall be required upon final acceptance of the public works project by the City. These forms are available from Washington State Department of Labor & Industries and can be filed electronically at:

http://www.lni.wa.gov/TradesLicensing/PrevWage/IntentAffidavits/File/default.asp

The undersigned declares that before preparing their bid, they read carefully the specifications and requirements for bidders and that their bid is made with the full knowledge of the kind, quality and quantity of services and equipment to be furnished, and their said bid is as stated on these pages.

Authorized Official (Signature) Date

Print Name of Authorized Official Title of Authorized Official

Company Name Telephone Number

Address City, State, Zip

The bidder shall attest by signing this statement in accordance with chapter **5.50** RCW verifying under penalty of perjury that the bidder is in compliance with the responsible bidder criteria requirements below:

Within the three-year period immediately preceding the date of the bid solicitation, not have been determined by a final and binding citation and notice of assessment issued by the department of labor and industries or through a civil judgment entered by a court of limited or general jurisdiction to have willfully violated, as defined in RCW **49.48.082**, any provision of chapter **49.46**, 49.48, or **49.52** RCW.

_____ _____

Authorized Official (Signature) Date

_____ _____

Print Name of Authorized Official Title of Authorized Official

_____ _____

Company Name

BID PROPOSAL FORM

TO: City of La Center
210 East 4th Street
La Center, Washington 98629

FROM: Bidder _____
Address _____
_____
Telephone _____

The undersigned, as bidder, declares that we have examined all of the contract documents and that we will contract with the City of La Center to do everything necessary to complete the work as outlined on the plans and specifications for the Community Center Parking Lot and Kitchen Remodel Project, PW 2023-01

We acknowledge that addenda numbers _____ to _____ have been delivered to us and have been examined as part of the contract documents. We agree that the Bid Bond, and the Qualification of Bidder, shall form a part of this proposal.

Attached is a bid bond duly completed by a guaranty company authorized to carry on business in the State of Washington, in the amount of at least five percent (5%) of the total amount of our proposal, or alternatively, there is attached a certified or cashier's check payable to the City of La Center in the amount of at least five percent (5%) of the total amount of our proposal.

If our BID is accepted, we agree to sign the contract form and to furnish the contract bond and the required evidences of insurance within ten (10) calendar days after receiving written notice of the award of contract.

We further agree, if our BID is accepted and a contract for performance of work is entered into with the City of La Center, to so plan the work and to prosecute it with such diligence that all of the work shall be completed within the time period stated in the contract. We understand that the City of La Center reserves the right to reject any or all bids and to determine which proposal is, in the judgment of the City of La Center, the lowest responsible bid, and which proposal, if any, should be accepted in the best interests of the City of La Center and that the City of La Center also reserves the right to waive any informalities in any proposal or bid.

We further state that we have not, either directly or indirectly, entered into any agreement, participated in any collusion, or otherwise taken any action in restraint of free competitive bidding in connection with such contract.

- Bidder agrees that the work will be completed for the kitchen remodel shall be completed between February 15th to May 12th of 2023 within **63** working days after receipt of Notice to Proceed. Work for the parking lot portion of the project, shall be completed between June 1st, 2023 and September 7th 2023 within **70** working days.

Any adjustment of this schedule shall be approved by the city. **The contract time working days may be suspended for ordering and delivery of the kitchen hood or other materials on the project that could impact the schedule.**

We propose to perform the work at the prices listed in the following bid schedule(s):

Notes

(1) See Special Provisions and Standard Specification for State, section 1-07.2(2) sales tax requirements for sales tax collected by the contractor as paid for the project.
(2) The City reserves the right to adjust the scope of this work to match available funds.
(3) The City reserves the right to reject any or all bids.
(4) The table below provides a list of items required to complete the project. It is the contractor's responsibility to complete the project scope to all required standards and specifications.
(5) The low bid will be the lowest base bid and alternatives that is in the owner's best interest. The owner reserves the right to reject or accept the alternate bids.

The city will review the bids to determine if they are within the budget

BID SCHEDULE A (Parking Lot Drive Aisle Reconstruction)

CITY OF LA CENTER BID PROPOSAL:

Item No.	Std. Spec	Description	Est. Quantity	Unit	Unit Price	Total Price
1.	1-09	Mobilization	1	L.S.		
2.	1-10	Project Temporary Traffic Control	1	L.S.		
3.	1-10	Construction Signs Class A	5	EA		
4.	2-02	Sawcut	1476	L.F.		
5.	2-03	Roadway Excavation, Incl. Haul	746	C.Y.		
6.	2.02	Removal of Structures and Obstructions	1	L.S.		
7.	4-04	1 ¼" minus Crushed Surfacing Base Course	935	Ton		
8.	9-33	Geotextile Separation Fabric for separation and pipe trench	1680	SY		
9.	9-33	Geogrid subgrade reinforcement	1680	SY		
10.	7-04	6-inch perforated storm drain pipe	330	LF		
11.	7-19	Storm sewer cleanout	1	EA		
12.	9-03.12(5)	Gravel Backfill for drywells	42	Tons		
13.	5-04	HMA Cl. ½ PG 58H-22	422	Ton		
14.	5-40	Striping Parking Lot	1	LS		

15.	2-03	Excavate and regrade bioswale	1	LS		
16.	8-02	Reseed bioswale	1	LS		
18	8-01	Erosion-Water Pollution Control	1	LS		
19	8-14.3	Cement Concrete Ramps	17	SY		
20	8-14	Cement Concrete Sidewalks	12	SY		
21	8-14.3(5)	Detectable Warning Surface	5	SY		
Total (Before Tax)						
8.4% Tax						
Total with Tax						

BID SCHEDULE B (Kitchen Remodel)
(Do not include Washington State or Local Sales Tax. *Sales Tax shall be added to the total base bid prior to Contract Execution to determine the Contract Sum and Sales Tax shall be paid by the Owner with each progress payment.)*

BID:

Item No.		Description	Est. Quantity	Unit	Unit Price	Total Price
1.		Mechanical	1	L.S.		
2.		Electrical	1	L.S.		
3.		Structural, Finishes, and all other work and materials	1	L.S.		
4.		Kitchen Equipment	1	L.S.		

Total (Before Tax)
8.4% Tax
Total with Tax

SUBCONTRACTORS
The Bidder further certifies that the following subcontracting firms or businesses will be awarded subcontracts, for the following portions of the work in the event that the Bidder is awarded the Contract.

MECHANICAL:
NAME: _____

ADDRESS: _____

WA CONTRACTORS REGISTRATION NO.: _____

ELECTRICAL:
NAME: _____

ADDRESS: _____

WA CONTRACTORS REGISTRATION NO.: _____

BID SCHEDULE C (Pave Parking Stalls)

Alternate Bid (Slurry Seal)					
1-09	Mobilization	1	LS		
1-10	HMA Cl. ½ PG 58H-22	333	Ton		
6-10.3(1)	Surface Preparation	2077	SY		
6-10.3(1)	Removal of structures and Obstructions	1	LS		
Total (Before Tax)					
8.4% Tax					
Total with Tax					

SCHEDULE D (Slurry Seal)

Alternate Bid (Slurry Seal)					
1-09	Mobilization	1	LS		
1-10	Traffic Control	1	LS		
5-02	Latex Modified Slurry Seal Type 2	4670	SY		

Total (Before Tax)	
8.4% Tax	
Total with Tax	

Total Bid Schedule A (Parking lot) and B (Kitchen)	

Total Bid Schedule A, B and C	

Total Bid Schedule A, B and D	

BIDDER acknowledges receipt of the following ADDENDUM:

Addendum No.	Addendum Receipt Date	Signed Acknowledgment
1	_____	_____
2	_____	_____
3	_____	_____
4	_____	_____

WASHINGTON STATE AND LOCAL SALES TAX. Sales Tax (8.4%) shall **not** be included in the unit bid prices per the requirements of the Special Provisions

BIDDER'S ADDRESS. Notice of Acceptance of this bid or requests for additional information should be addressed to the undersigned at the address stated below.

NON-COLLUSION DECLARATION. I, by signing the proposal, hereby declare, under penalty of perjury under the laws of the United States that the following statements are true and correct:

1. That the undersigned person(s), firm, association or corporation has (have) not, either directly or indirectly, entered into any agreement, participated in any collusion, or otherwise taken any action in restraint of free competitive bidding in connection with the project or which this proposal is submitted.

2. That by signing the signature page of this proposal, I am deemed to have signed and have agreed to the provisions of this declaration.

NOTES:

1. This proposal form is not transferable and any alteration of the firm's name entered hereon without prior permission from the Public Works Director will be cause for considering the proposal irregular and subsequent rejection of the bid.

SIGNATURE

Date: _____ _____

Proper Name of Bidder

Contractor's License No.: _____

By:_____

_____

Address

_____

City State Zip

NON-COLLUSION AFFIDAVIT

STATE OF _____)

) SS. NON-COLLUSION AFFIDAVIT

COUNTY OF _____)

_____, being first duly sworn, on his/her oath says that he/she is an authorized representative of the firm of _____, and that the bid above submitted is a genuine and not a sham or collusive bid, or made in the interest or on behalf of any person not therein named; and he/she further says that the said bidder has not directly or indirectly induced or solicited any bidder on the above work or supplies to put in a sham bid, or any other person or corporation to refrain from bidding; and that said bidder has not in any manner sought by collusion to secure to _____ self an advantage over any other bidder or bidders.

SIGN HERE _____
(Contractor)

Subscribed and sworn to before me this _____ day of _____, _____.

_____

Notary Public in and for the State of _____

Residing at _____

BID BOND

KNOW ALL MEN BY THESE PRESENTS, that we, the undersigned, _____ _____ as Principal, and _____ as Surety, are hereby held and firmly bound unto _____ as Owner, in the penal sum of: _____ for the payment of which, well and truly to be made, we hereby jointly and severally bind ourselves, successors and assigns.

SIGNED, this _____ day of _____, _____.

The condition of the above obligation is such that whereas the Principal has submitted to: _____ a certain Bid attached hereto and hereby made a part hereof to enter into a contract in writing, for the _____.

NOW, THEREFORE,

a) If said Bid shall be rejected, or

b) If said Bid shall be accepted and the Principal shall execute and deliver a contract in the form of contract attached hereto (properly completed in accordance with said Bid) and shall furnish a bond for his faithful performance of said contract, and for the payment of all persons performing labor or furnishing materials in connection therewith, and shall in all other respects perform the agreement created by the acceptance of said Bid, then this obligation shall be void, otherwise the same shall remain in force and effect; it being expressly understood and agreed that the liability of the Surety for any and all claims hereunder shall, in no event, exceed the penal amount of this obligation as herein stated.

The Surety, for value received, hereby stipulates and agrees that the obligations of said Surety and its bond shall be in no way impaired or affected by an extension of the time within which the Owner may accept such Bid; and said Surety does hereby waive notice of any such extension.

IN WITNESS WHEREOF, the Principal and the Surety have hereunto set their hands and seals, and such of them as are corporations have caused their corporate seals to be hereto affixed and these presents to be signed by their proper officers, the day and year first set forth above.

_____ (L.S.)

Principal **Title**

_____

Surety

By: _____

IMPORTANT: Surety Companies executing bonds must appear on the Treasury Department's most current list (Circular 570 as amended) and be authorized to transact business in the state where the project is located.

BIDDER QUALIFICATIONS

Project: La Center Community Center Parking Lot Project **, PW 2023-01**

If the above contract is awarded to our company, the following persons will be authorized to sign change orders, progress payments and similar documents for the company: (names and positions)

_____

_____

The contractor's superintendent at the job site per Article 1-05.13 of the Standard Specifications will be (give full name):_____

The last three projects completed or substantially completed by our company involving similar construction work are as follows:

1. Project Name: _____

   Dollar amount of Contract: $_____

   Owner: _____

   Owner's Representative: _____ Phone no.: _____

   Contractor's Superintendent on this project: _____

   Brief Description of Project Scope: _____

   _____

   _____

2. Project Name: _____

   Dollar amount of Contract: $_____

   Owner: _____

   Owner's Representative: _____ Phone no.: _____

   Contractor's Superintendent on this project: _____

   Brief Description of Project Scope: _____

   _____

   _____

3. Project Name: _____

Dollar amount of Contract: $_____

Owner: _____

Owner's Representative: _____ Phone no.: _____

Contractor's Superintendent on this project: _____

Brief Description of Project Scope: _____

_____

_____

Title of Person completing this form_____

Signature_____ Date _____

Phone No._____

PART II- CONTRACT FORMS

AGREEMENT

THIS AGREEMENT, made this _____ day of _____, 2023, by and between the City of La Center, Washington, hereinafter called "Owner," and of _____, doing business as (an individual) or (a partnership) or (a corporation), hereinafter called "Contractor."

WITNESSETH: that for and in consideration of the payments and agreements hereafter mentioned:

The Contractor will furnish all of the material, supplies, tools, equipment, labor, and other services necessary for the construction and completion of the project described herein.

PROJECT DESCRIPTION: There are two parts of this project.

The first part of the project consists of reconstruction of portions of the parking lot drive aisle that has failing subgrade and pavement. This project will include reconstruction some handicap ramps and adding a grease interceptor outside the Community Center building, just outside the kitchen. This is schedule A.
Schedule B consists of removing the parking stall pavement, regarding the base and paving.
Schedule C consists of slurry sealing the drive aisle and parking stalls. There are separate civil plans that show the parking lot reconstruction.

The second part of the project is to remodel the kitchen inside the Community Center building. This remodel has been designed by Collins Architecture. This document also includes specifications of the Architectural, Structural, Mechanical and Plumbing documents to complete the remodel. There will also be separate plans for this kitchen remodel.

The Contractor will commence the work required by the Contract Documents within ten (10) calendar days after the date of the Notice to Proceed, work for the kitchen remodel shall be work for the kitchen remodel shall be completed between February 15th to May 12th of 2023 within **63** working days after receipt of Notice to Proceed. Work for the parking lot portion of the project, shall be completed between June 1st, 2023 and September 7th 2023 within 70 working days. Any adjustment of this schedule shall be approved by the city.

The Contractor agrees to perform all of the work described in the Contract Documents including and comply with the terms therein for the total price of_____
_____ Dollars and _____ Cents ($, .).

The term "Contract Documents" means and includes the following:

Invitation to Bid Instructions to Bidders Bid Proposal Form Non-Collusion Affidavit Bid Bond Agreement Payment Bond Performance Bond Notice of Award	Notice to Proceed Change Order City of La Center Special Provisions Contract Bid Items Contract Drawings Prepared or Issued by the City of La Center Standard Plans Addendum: All items included within these Contract Documents.

The Owner will pay to the Contractor in the manner and at such times as set forth in the General Conditions such amounts as required by the Contract Documents.

This Agreement shall be binding upon all parties hereto and their respective heir, executors, administrators, successors, and assigns.

IN WITNESS WHEREOF, the parties hereto have executed, or caused to be executed by their duly authorized officials, this Agreement in duplicate, each of which shall be deemed an original, on the date first above written.

OWNER:

By: _____

(SEAL) Typed Name: _____

Title: _____

ATTEST:

_____

Typed Name: _____

Title: _____

CONTRACTOR:

By: _____

(SEAL) Typed Name: _____

Title: _____

Address: _____

_____

ATTEST:

_____

Typed Name: _____

Title: _____

PAYMENT BOND

KNOW ALL MEN BY THESE PRESENTS: That, WHEREAS, the City of La Center, State of Washington, on has awarded to _____, hereinafter designated as "Principal," a Contract for construction of the **Community Center Parking Lot and kitchen remodel PROJECT, PW 2023-01**, the terms and provisions of which contract are incorporated herein by reference, and;

WHEREAS, said Principal is required to furnish a bond in connection with this said Contract, providing that if said Principal, or any of his or its subcontractors, shall fail to pay for any materials, provisions, provender or other supplies or teams used in, upon, for, or about the performance of the work contracted to be done, or any other work or labor done thereon of any kind, the Surety of this body will pay the same to extend hereinafter set forth;

NOW, THEREFORE, we the Principal and _____, as Surety, are held and firmly bound unto the City of La Center, State of Washington, in the penal sum of _____ ($, .), lawful money of the United States, being one hundred percent (100%) of the Contract amount for the payment of which sum well and truly to be made, we bond ourselves, our heirs, executors, administrators and successors, jointly and severally, firmly by these presents.

NOW, THEREFORE, if the above bounden Principal or any of his subcontractor shall promptly make payment to all persons supplying labor and material or amounts due in the prosecution of the work provided for in said Contract, and any and all duly authorized modifications of said Contract that may hereafter be made, then this obligation shall be void; otherwise, this obligation shall remain in full force and virtue; and if the bounden Principal or any of his subcontractors fails to promptly pay any of the persons or amounts due with respect to work or labor performed by any such claimant, the Surety will pay for the same, in an amount not exceeding the sum specified in this bond, and also in case suit brought upon this bond, a reasonable attorney's fee, be fixed by the court; and this bond shall insure to the benefit of any

persons so as to give a right of action to such persons or their assigns in any suit brought upon this bond.

The bond shall insure to the benefit of any all persons, companies and corporations entitle to file claims, so as to give a right of action to them or their assigns in any suit brought upon this bond.

And the said Surety, for value received, hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the Contract, or to the work to be performed hereunder, or the Specifications accompanying the same shall in any wise affect its obligations on this bond; and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the Contract, or to the work or to the Specifications.

IN WITNESS WHEREOF, the above bounden parties have executed this instrument under their seals this _____ day of _____, 2023, the name and corporate seal of each corporate party being hereto affixed and these presents duly signed by its undersigned representative, pursuant to authority of its governing body.

_____	_____
_____	_____
_____	_____
Attorney-in-Fact, Surety	Principal

_____

Name and Address
Local Office of Agent

NOTE: Date of Bond must not be prior to date of contract. If Contractor is Partnership, all partners should execute bond.

IMPORTANT: Surety Companies executing Bonds must appear on the Treasury Department's most current list (Circular 570 as amended) and be authorized to transact business in the State where the project is located.

PERFORMANCE BOND

KNOW ALL MEN BY THESE PRESENTS: That, WHEREAS, the City of La Center, State of Washington, on_____, has awarded to_____, hereinafter designated as "Principal," a Contract for construction of the 2023 Community Center Parking Lot and kitchen remodel PROJECT**, PW 2023-01**, the terms and provisions of which contract are incorporated herein by reference, and;

WHEREAS, said Principal is required under the terms of said Contract to furnish a bond for the faithful performance of said Contract;

NOW, THEREFORE, we the Principal and _____, as Surety, are held and firmly bound unto the City of La Center, State of Washington, in the penal sum of _____ ($, .), lawful money of the United States, being one hundred percent (100%) of the Contract amount for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators and successors, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH, that if the above bound Principal, his or its heirs, executors, administrators, successors, or assigns, shall in all things stand to and abide by, and well and truly keep and faithfully perform the covenants, conditions, and agreements in the said Contact and any alterations made as therein provided, on his or their part, to be kept and performed at the time and in the manner therein specified, and in all respects according to their true intent and meaning, and shall indemnify and save harmless, its officers and agents, as therein stipulated, then this obligation shall become null and void; otherwise it shall be and remain in full force and virtue.

As a condition precedent to the satisfactory completion of the said Contract, the above obligation to the amount of _____ ($, .), shall hold good for a period of one (1) year after the completion and acceptance of the said work, during which time if the above bounden Principal, his or its heirs, executors, administrators, successors or assigns shall fail to make full, complete and satisfactory repair and replacements or totally protect the said from loss or damage made evident during said period of one (1) year from the date of acceptance of said work, and resulting from or caused by defective

materials or faulty workmanship in the prosecution of the work done, the above obligation in the said sum of _____ ($, .), shall remain in full force and virtue; otherwise the above obligation shall be void.

And the said Surety, for value received, hereby stipulates and agrees that no change, extension of time, alteration of addition to the terms of the Contract or to the work to be performed hereunder or the Specifications accompanying the same shall in any wise affect its obligations on this bond; and it does hereby waive notice of any such change, extension of time alteration or addition to the terms of the Contract, or to the work, or to the Specifications.

In the event the City of La Center or its successors or assigns, shall be the prevailing party in an action brought upon this bond, then in addition to the penal sum hereinabove specified, we agree to pay to said, or its successors or assigns, a reasonable sum on account of attorney's fees in such action, which sum shall be fixed by the court.

IN WITNESS WHEREOF, the above bounden parties have executed this instrument under their seals this _____ day of _____, 2023, the name and corporate party being hereto affixed and these presents duly signed by its undersigned representative, pursuant to authority of its governing body.

_____	_____
_____	_____
_____	_____
Attorney-in-Fact, Surety	Principal

_____

Name and Address
Local Office of Agent

NOTE: Date of Bond must not be prior to date of contract. If Contractor is Partnership, all partners should execute bond.

IMPORTANT: Surety Companies executing Bonds must appear on the Treasury Department's most current list (Circular 570 as amended) and be authorized to transact business in the State where the project is located.

NOTICE OF AWARD

DATE:

TO: _____
_____
_____

PROJECT NAME: 2023 Community Center Parking Lot and kitchen remodel Project**, PW 2023-0**1

The Owner has considered the Bid submitted by you for the above described work in response to its Advertisement for Bids dated_____, and Contract Documents.

You are hereby notified that your bid has been accepted for items in the amount of _____ Dollars and _____ Cents ($, .).

You are required by the Bidding Documents to execute the Agreement and furnish the required Contractor's Performance Bond, Payment Bond, and Certificates of Insurance (including complete insurance coverage for the Owner and City of La Center) within ten (10) calendar days from the date of this notice to you.

Intent to pay prevailing wages shall be demonstrated before Notice to Proceed is executed.

If you fail to execute said Agreement and to furnish said Bonds within ten (10) calendar days from the date of this notice, said Owner will be entitled to such other rights as may be granted by law.

You are required to return an acknowledged copy of this Notice of Award to the Owner.

Dated this _day of _____, 2023.

City of La Center
Owner

By: _____

Title: _____

ACCEPTANCE OF NOTICE

Receipt of the above **NOTICE TO AWARD** is hereby acknowledged.

Firm:_____, this the _____ day of _____, 2023

By:_____

Title:_____

NOTICE TO PROCEED

TO: _____
_____
_____

PROJECT NAME: 2022 Community Center Parking Lot Project and kitchen remodel**, PW 2023-01**

You are hereby notified to commence work in accordance with the Agreement dated _____, 2023, within ten (10) calendar days of the date of this notice, or , 2023, and you are to complete between February 15th to May 12th of 2023 within **63** working days after receipt of Notice to Proceed. Work for the parking lot portion of the project, shall be completed between June 1st, 2023 and September 7th 2023 within **70** working days. Any adjustment of this schedule shall be approved by the city.
. The date of completion is therefore_____, 2023.

City of La Center
Owner

By: _____

Title: _____

ACCEPTANCE OF NOTICE

Receipt of the above **NOTICE TO PROCEED** is hereby acknowledged.

Firm:_____, this Day of, 2023.

By:_____

Title:_____

CHANGE ORDER

Change Order No. 1

Date: _____

Agreement Date: _____

NAME OF PROJECT:

2023 Community Center Parking Lot and kitchen remodel Project, PW 2023-01

OWNER:

City of La Center

CONTRACTOR:

_____

The following changes are hereby made to the Contract:

Justification: _____

_____

Original Contract Price was:	$ _____
Previously Approved Change Order(s):	$0.00
Contract Price prior to this Change Order:	$
Contract Price for this Change Order will be (increased) (decreased) by:	$
New Contract Price including this Change Order will be:	$

The Contract Time will be (circle one) *increased decreased* (*unchanged)* by (___) working days.

The date for substantial completion as of the date of this Change Order, therefore, is

_____ (Date).

To be effective, this Order must be approved by the federal agency if it changes the scope or objective of the Project, or as may otherwise be required by the Special Provisions.

Requested by: _____

Recommended by: _____

Ordered by: _____

Accepted by: _____

CITY OF LA CENTER SPECIAL PROVISIONS

The special provisions are divided into two sections. The first section describes the improvements for the parking lot reconstruction outside the Community Center building, and the second part is a remodel of the Community Center Kitchen.

CITY OF LA CENTER
SPECIAL PROVISIONS

STANDARD SPECIFICATIONS for Parking Lot Reconstruction

The Standard Specifications for this project shall be the "2022 Standard Specifications for Road, Bridge, and Municipal Construction as prepared by the Washington State Department of Transportation and the Washington State Chapter of the American Public Works Association, and as amended under Amendments to the Standard Specifications.

All modifications made in these Special Provisions shall take precedence over the Standard Specifications and the Amendments to the Standard Specifications. The reference made herein shall only mean the inclusion of the specific technical section referenced, and shall include any amendments made, if applicable.

All number references in these Special Provisions shall be understood to refer to the section or subsection of the Standard Specifications bearing like numbers.

It should be understood that all references to state officers in the Standard Specifications shall mean the corresponding City of La Center officers for the purpose of this contract. For example, all references to the Highway Commission shall mean the City of La Center Council and all references to the Director of Highway shall mean the City's Director of Public Works, etc. Also, any references to Thurston County shall be understood to mean the City of La Center.

A copy of the Standard Specifications is available for review at the office of the Engineer.

1-01 DEFINITIONS AND TERMS

1-01.3 Definitions

Amend as follows:

Engineer. La Center City Engineer, or his designated representatives.

Owner. Council of the City of La Center as represented by it's authorized officers, employees, or agents.

All references to "State Materials Laboratory" shall be revised to read "Contracting Agency designated location".

1-03 AWARD AND EXECUTION OF CONTRACT

1-03.2 Award of Contract

Add the following paragraph:

> "The award of the contract shall be made only to responsible contractors that possess the potential ability to perform successfully under the terms and conditions of the Agreement. Consideration shall be given to contractor integrity, compliance with public policy, record of past performance, and financial and technical resources. Any and all bids may be rejected when there are sound documented reasons for doing so. The Owner reserves the right to make these judgments. The Owner will award the contract within sixty (60) days after the Bid Opening.
>
> The "lowest responsible Bidder" shall be determined from the Contract Unit Bid Prices and Bid Proposal if selected by the Owner."

1-04 SCOPE OF WORK

Add the following paragraph:

The project consists of reconstruction of portions of the parking lot drive aisle that has failing subgrade and pavement. Pavement of the entire drive aisle shall be completed following reconstruction of the failing areas, and the entire drive aisle will be paved (Schedule A). Schedule B shall will be the kitchen remodel, per the Architectural drawings. Schedule C consists of removing asphalt in the parking stall area and replacing it with new HMA. Schedule D includes slurry sealing the entire parking.)

1-05 CONTROL OF WORK

1-05.3 Plans and Working Drawings

Add the following paragraph:

> "The city will not furnish the contractor with a hard copy of the plans. Only an electronic copy will be available from the city website. The Contractor shall keep one copy of the contract documents on the project, in good order, available to the Engineer and to his representatives. All plans, drawings, specifications, and copies thereof furnished by the Engineer are his property. They are not to be used on other work and, with the exception of the signed contract set, are to be returned to him on request at the completion of the work."

1-05.10(1) Guarantees

Add the following paragraph:

"The Contractor shall guarantee all work for a period of one year from and after the date of acceptance of the work by the Owner."

1-05.12 Final Acceptance

Add the following paragraphs:

"Prior to substantial completion, the City, with the approval of the Contractor, may use any completed or substantially completed portions of the work. Such use shall not constitute an acceptance of such portions of the work.

The acceptance by the Contractor of final payment shall be and shall operate as a release to the City of all claims and all liability to the Contract other than claims in stated amounts as may be specifically excepted by the Contractor in writing prior to the request for final payment for all things done or furnished in connection with this work and for every act and neglect of the City and it's agents and others relating to or arising out of this work. However, any payment, final or otherwise, or any acceptance, shall not release the Contractor or it's sureties from any obligations under the Contract Documents or the Performance and Payment Bonds or diminishes the City's rights under the guaranty provisions."

1-05 CONTROL OF WORK

Add the following paragraphs:

The contractor shall be required to provide surveying for the project. The surveyor will need to provide staking for the curb, gutter, sidewalk and ramp reconstruction. Staking will also include the storm system and connections to the catch basin and bioswale construction. The areas of the drive aisle reconstruction will be marked in the field by the "Engineer".
The payment for surveying will be included in the unit prices for ramp and storm drain construction.

1-06 CONTROL OF MATERIAL

1-06.2(1) Samples and Tests for Acceptance

Section 1-06.2(2) is supplemental as follows:

Material sampling for testing may be performed by a qualified testing company. The contractor shall hire a testing company to provide testing of the base material, with compaction testing meeting WSDOT requirements. The contractor shall also employ the company to test the asphalt material and compaction.

The Contractor shall provide passing test results to the Engineer for all sources and materials proposed for backfill prior to use.

If material fails to meet specifications, and re-test shall be performed.

Payment:
Payment for testing of the base and asphalt shall be included in unit cost of base and asphalt payment for this project.

1-07 LEGAL RELATIONS AND RESPONSIBILITIES TO THE PUBLIC

1-07.2 State Taxes

Add the following paragraph:

"The Contractor shall **not** include Washington State Retail Sales Tax in the Unit Bid Prices for the project portion of the project and shall conform to the requirements of Section 1-07.2 (2) of the "Standard Specifications." The contractor shall collect from the agency Retail Sales Tax on the full contract price.

1-07.5(3) State Department of Ecology

Sand and Gravel Source Compliance to the Clean Water Act
Each source/supplier of sand and gravel for this project will provide either a current Sand and Gravel permit number issued by the Washington State Department of Ecology, or a current Application for Coverage, also issued by the Department of Ecology prior to source approval.

1-07.9 Wages

Add the following paragraph:

“It shall be the Contractor's responsibility to determine current Labor and Industries Wage Rates as necessary for the completion of the project."

1-07.15(1) Spill Prevention, Control, and Countermeasures Plan

The second sentence of the first paragraph is deleted.

The first sentence of the second paragraph is revised to read:

The contractor will be required to implement an SPCC Plan and shall address all fuels, petroleum products, hazardous materials, and other materials defined in Chapter 447 of the WSDOT Environmental Manual M 31-11.

Item number four of the fourth paragraph (up until the colon) is revised to read:

4. **Potential Spill Sources** – Describe each of the following for all potentially hazardous materials brought or generated on-site, including but not limited to materials used for equipment operation, refueling, maintenance, or cleaning:

The first sentence of item 7e of the fourth paragraph is revised to read:

BMP methods and locations where they are used to prevent discharges to ground or water during mixing and transfer of hazardous materials and fuel.

The preparation and implementation of the SPCC plan shall be included in general bid items for work and no specific bid item is designated for this item.

Payment:
Payment for he SPCC plan shall be incorporated in the unit bid items for this project.

1-07.16(4) Archaeological and Historical Objects

And,

1-07.16(4) An Inadvertent Discovery of Human Skeletal Remains

The following shall be added to section 1-07.16 (4) and 1-07.16 (4) A

In the event any archaeological or historic materials are encountered during project activity, work in the immediate area (initially allowing a 100-foot buffer; this number may vary by circumstance) must stop and the following actions taken:

1. Implement reasonable measures to protect the discovery site, including any appropriate stabilization or covering; and
2. Take reasonable steps to ensure the confidentiality of the discovery site and,
3. Take reasonable steps to restrict access to the site of discovery.

The project proponent will notify the concerned Tribes and all appropriate county, state, and federal agencies, including the Department of Archaeology and Historic Preservation. The agencies and Tribe (s) will discuss possible measures to remove or avoid cultural material, and will reach an agreement with the project proponent regarding actions to be taken and disposition of material.

If human remains are uncovered, appropriate law enforcement agencies shall be notified first, and the above steps followed. If the remains are determined to be Native, consultation with the affected Tribes will take place in order to mitigate the final disposition of said remains.

See the Revised Code of Washington, Chapter 27.53, "Archaeological Sites and Resources," for applicable state laws and statutes. See also Washington State Executive Order 05-05, "Archaeological and Cultural Resources." Additional state and federal law (s) may also apply.

Follow the plans for direction by the Cowlitz Tribe for inadvertent discovery.

1-07.17 Utilities and Similar Facilities

Add the following paragraphs:

"The Contractor shall call the Northwest Utilities Notification Center (One Call Center) at 1-800-424-5555 for field location, not less than two or more than ten working days before the scheduled date for commencement of excavation which may affect underground utility facilities. The Contractor shall under no circumstances expose any utility without first obtaining permission from the appropriate utility agency.

The Contractor shall be solely and directly responsible to the Owner and Owners of Utilities for any and all damage, disruption of service, or claims which may result from the construction operations. The Contractor shall make all necessary arrangements for protection of existing power and telephone lines in the vicinity of this Contract that interfere with construction.

Neither the Owner nor its officers or agents shall be responsible to the Contractor for damages as a result of the Contractor's failure to protect utilities encountered in the work.

Restoration of utilities damaged by the Contractor, his agents or employees, shall be accomplished by the utility involved at the Contractor's expense."

1-07.17(2) Utility Construction, Removal or Relocation by Others

Add the following paragraphs:

The Contractor shall be responsible for coordinating with the utility company for conflicting utilities to facilitate work as described in these specifications and plans. for conflicting utilities. The contractor shall coordinate with the utility company as necessary to protect the existing facilities during construction.
The following are a list of contacts for the utility companies that could affected by construction. If any work is required by utility companies, not identified on the plans the contractor shall coordinate the schedule and work to be done by the companies.

Water:
Clark Public Utilities
Barry Lovingood
Vancouver, WA.
(360) 992-8020

blovingood@clarkpud.com

TDS Telephone
P.O. Box 218
La Center, WA. 98629
(360) 263-2194

Electrical:
Clark Public Utilities
David Tetz
Vancouver, WA.
(360) 992-8781

1-07.18 Public Liability and Property Damage Insurance

Delete this section in its entirety, and replace it with the following:

1-07.18 Insurance
(May 10, 2006 APWA GSP)

1-07.18(1) General Requirements

A. The Contractor shall obtain the insurance described in this section from insurers approved by the State Insurance Commissioner pursuant to RCW Title 48. The insurance must be provided by an insurer with a rating of A-: VII or higher in the A.M. Best's Key Rating Guide, which is licensed to do business in the state of Washington (or issued as a surplus line by a Washington Surplus lines broker). The Contracting Agency reserves the right to approve or reject the insurance provided, based on the insurer (including financial condition), terms and coverage, the Certificate of Insurance, and/or endorsements.

B. The Contractor shall keep this insurance in force during the term of the contract and for thirty (30) days after the Physical Completion date, unless otherwise indicated (see C. below).

C. If any insurance policy is written "on a claims" made form, its retroactive date, and that of all subsequent renewals, shall be no later than the effective date of this Contract. The policy shall state that coverage is claims made, and state the retroactive date. Claims-made form coverage shall be maintained by the Contractor for a minimum of 36 months following the Final Completion or earlier termination of this contract, and the Contractor shall annually provide the Contracting Agency with proof of renewal. If renewal of the claims made form of coverage becomes unavailable, or economically prohibitive, the Contractor shall purchase an extended reporting period ("tail") or execute another form of guarantee acceptable to the Contracting Agency to assure financial responsibility for liability for services performed.

D. The insurance policies shall contain a "cross liability" provision.

E. The Contractor's and all subcontractors' insurance coverage shall be primary and non-contributory insurance as respects the Contracting Agency's insurance, self-insurance, or insurance pool coverage.

F. All insurance policies and Certificates of Insurance shall include a requirement providing for a minimum of 30 days prior written notice to the Contracting Agency of any cancellation in any insurance policy.

G. Upon request, the Contractor shall forward to the Contracting Agency a full and certified copy of the insurance policy(s).

H. The Contractor shall not begin work under the contract until the required insurance has been obtained and approved by the Contracting Agency.

I. Failure on the part of the Contractor to maintain the insurance as required shall constitute a material breach of contract, upon which the Contracting Agency may, after giving five business days notice to the Contractor to correct the breach, immediately terminate the contract or, at its discretion, procure or renew such insurance and pay any and all premiums in connection therewith, with any sums so expended to be repaid to the Contracting Agency on demand, or at the sole discretion of the Contracting Agency, offset against funds due the Contractor from the Contracting Agency.

J. All costs for insurance shall be incidental to and included in the unit or lump sum prices of the contract and no additional payment will be made.

1-07.18(2) Additional Insured

All insurance policies, with the exception of Professional Liability and Workers Compensation, shall name the following listed entities as additional insured(s):

- the City of La Center, and its officers, elected officials, employees, agents, and volunteers

The above-listed entities shall be additional insured(s) for the full available limits of liability maintained by the Contractor, whether primary, excess, contingent or otherwise, irrespective of whether such limits maintained by the Contractor are greater than those required by this Contract, and irrespective of whether the Certificate of Insurance provided by the Contractor pursuant to 1-07.18(3) describes limits lower than those maintained by the Contractor.

1-07.18(3) Subcontractors

Contractor shall ensure that each subcontractor of every tier obtains and maintains at a minimum the insurance coverages listed in 1-07.18(5)A and 1-07.18(5) B. Upon request of the Contracting Agency, the Contractor shall provide evidence of such insurance.

1-07.18(4) Evidence of Insurance

The Contractor shall deliver to the Contracting Agency a Certificate(s) of Insurance and endorsements for each policy of insurance meeting the requirements set forth herein when the Contractor delivers the signed Contract for the work. The certificate and endorsements must conform to the following requirements:

1. An ACORD certificate or a form determined by the Contracting Agency to be equivalent.
2. Copies of all endorsements naming Contracting Agency and all other entities listed in 1-07.18(2) as Additional Insured(s), showing the policy number. The Contractor may submit a copy of any blanket additional insured clause from its policies instead of a separate endorsement. A statement of additional insured status on an ACORD Certificate of Insurance shall not satisfy this requirement.
3. Any other amendatory endorsements to show the coverage required herein.

1-07.18(5) Coverages and Limits

The insurance shall provide the minimum coverages and limits set forth below. Providing coverage in these stated minimum limits shall not be construed to relieve the Contractor from liability in excess of such limits. All deductibles and self-insured retentions must be disclosed and are subject to approval by the Contracting Agency. The cost of any claim payments falling within the deductible shall be the responsibility of the Contractor.

1-07.18(5)A Commercial General Liability

A policy of Commercial General Liability Insurance, including:

Per project aggregate
Premises/Operations Liability
Products/Completed Operations – for a period of one year following final acceptance of the work.
Personal/Advertising Injury
Contractual Liability
Independent Contractors Liability
Stop Gap / Employers' Liability
Explosion, Collapse, or Underground Property Damage (XCU)
Blasting (only required when the Contractor's work under this Contract includes exposures to which this specified coverage responds)

Such policy must provide the following minimum limits:

$1,000,000 Each Occurrence
$2,000,000 General Aggregate
$1,000,000 Products & Completed Operations Aggregate
$1,000,000 Personal & Advertising Injury, each offence

Stop Gap / Employers' Liability

$1,000,000 Each Accident
$1,000,000 Disease - Policy Limit
$1,000,000 Disease - Each Employee

1-07.18(5)B Automobile Liability

Automobile Liability for owned, non-owned, hired, and leased vehicles, with an MCS 90 endorsement and a CA 9948 endorsement attached if "pollutants" are to be transported. Such policy(ies) must provide the following minimum limit:

$1,000,000 combined single limit

1-07.18(5)C Workers' Compensation

The Contractor shall comply with Workers' Compensation coverage as required by the Industrial Insurance laws of the state of Washington.

1-07.23 Traffic Control

Add the following paragraphs:

"It shall be the Contractor's responsibility to prepare a detailed traffic control plan in accordance with Section 1-07.23 of the Standard Specifications.

Within five days from notice to proceed, and prior to the start of any construction, the Contractor shall submit a written traffic control plan to the City. The traffic control plan shall be in strict conformance with the latest edition of the "Manual for Uniform Traffic Control Devices" and shall be subject to approval by the Engineer and the City of La Center. The Contractor shall schedule two working days for the Engineer's approval of the traffic control plan. No work shall be completed on this project until the Engineer has provided written approval of the Contractor's traffic control plan. Time extensions will not be approved for any delays in the project as a result of the Contractor's failure to provide a written traffic control plan in strict conformance with these specifications. See Division 1 for additional requirements.

The proper signing and warning devices shall be in place to protect bicycle and pedestrian traffic at all times. It shall be the contractor's responsibility to monitor and maintain the TCD's as necessary.

At least one lane of the parking lots shall be maintained at all times during daily work by the contractor. At the end of the work day, the parking lot will be required to be open until the next day of work on this project. The contractor will have to propose a traffic control plan that shows the drive aisle closures, complying with the WSDOT Traffic Control Plan not included in this project, and requirements in WSDOT 2022 Standard Specifications for Construction. The city will need to review the plan to determine if it is acceptable before implementation.

1-08 PROSECUTION AND PROGRESS

1-08.5 Time for Completion

Add the following paragraph:

"The project shall be completed in its entirety within the timeline as stated below after the Notice to Proceed."

The last two sentences in the first paragraph are revised to read:

- When any of these holidays fall on a Sunday, the following Monday shall be counted a nonworking day. When the holiday falls on a Saturday, the preceding Friday shall be counted a nonworking day. The days between December 25 and January 1 will be classified as nonworking days. The last day of school is June 21st 2023. **The contractor shall try to not start work on the parking lot until the last day of school on June 15th (This date for 2023 will need to be verified). The contractor shall make every effort to complete the major portion of excavation when after school is out for the summer, and before school is in session in August. School should begin on August 26th, 2023, but this will have to be verified. The contactor will need to accommodate school traffic parking on the parking lot each day. Parents will park on this lot during school "drop off" and school "Pick Up". It may be necessary to restrict parking during paving and portions of excavation, storm pipe installation and base placement, and no parking signs will need to be placed to protect the surface temporarily.** The contractor will not be able to work on July 29th and July 30th due to Our Days Festival (date needs to be verified). The contract will need to have the project limits secure during this time.
- **The contract time working days may be suspended for ordering and delivery of the kitchen hood or other long lead items.**

1-08.7 Maintenance During Suspension

The Contractor shall maintain the erosion and sediment control even if the Contracting Agency is performing the routine maintenance work on the other items.

1-10 TEMPORARY TRAFFIC CONTROL

1-10.2(1) Traffic Control Management

The Traffic Control Supervisor shall be certified by one of the following:

The Northwest Laborers-Employers Training Trust
27055 Ohio Ave.
Kingston, WA 98346
360-297-3035

Evergreen Safety Council
401 Pontius Ave. N.
Seattle, WA 98109

1-800-521-0778 or
206-382-4090

1-10.2(2) Traffic Control Plans

The Contractor's proposed traffic control plan(s), and parking lot plan or any proposed modified plan(s) shall be submitted to the Engineer for review and approval at least five (5) working days in advance of the time the new plan will be implemented. No work can commence on this project until the traffic control plans submitted by the Contractor have been approved and all required traffic control devices are in place. All traffic control plans shall conform to Section1-10.2(3).

The contractor shall install no parking signs along parking stalls in the Community Center Parking lot to prevent parking during excavation of the drive aisle, paving of the parking stalls or slurry seal of the parking stalls. The contractor shall replace base, and subsurface drainage pipe, for excavated areas so that at the end of working day there are not open excavations left during the night.
The signs will be installed at least 48 hours prior to any work to prevent parking on the parking lot.

Section 1-10.4(2) shall be amended as follows:

Construction Signs, Class A will be measured by each for each sign and will be paid as each.

1-10.5(1) Payment

Add the following:

The lump sum payment shall be for temporary traffic control shall include materials and labor to perform the temporary traffic control according the plans and specifications.

2-01 CLEARING, GRUBBING, AND ROADSIDE CLEANUP

2-01.4 Measurement

Add the following:

No unit of measurement shall apply to this item and the price shall be included in the pavement reconstruction.

"Roadside Cleanup" shall include minor grading of slopes cleaning the roadway and parking lot from debris, landscaping, and approaches to original condition that are adjacent to, impacted by, or on which work has occurred. Final clean up shall be to the satisfaction of the Engineer and per Section 1-04.11.

2-02 REMOVAL OF STRUCTURES AND OBSTRUCTIONS

2-02.3(3) Removal of Pavement

No. 1 in the first paragraph of Section 2-02.3(3) are revised to read as follows:

1. Haul broken-up pieces of pavement and roadway embankment to an approved off-site location.

2-02.4 Measurement

Add the following:

Measurement of sawcutting will be by the linear foot of completed sawcut, regardless of depth.

2-02.4 Payment

Add the following:

"Sawcut", per linear foot.

2-03 ROADWAY EXCAVATION AND EMBANKMENT

2-03.3 Construction Requirements

Add the following:

When excavating the existing parking lot, the Contractor shall also excavate the existing asphalt, base and subgrade to design subgrade depth and replace with a minimum 0.33 feet of HMA 58H-22 over 12-inches of compacted crushed surfacing 1 ¼ minus base per section 9-03.9(3) of WSDOT specifications.

The contractor will employ a Geotechnical testing company for required compaction tests of the HMAC paving. Compaction tests of the base section will also need to be done. The contractor shall allow the testing company enough time to perform testing and no additional working days shall be given for time required to perform testing. Payment for compaction will be included in the bid items for construction of the as shown on the plans and no additional pay will be made for testing or achieving compaction.

For excavation of the bioswale, placement of additional rip rap to prevent scouring will be part of the unit price for Roadway Excavation and Embankment.

2-03.4 Measurement

Add the following:

"Roadway Excavation Incl. Haul", shall be measured by the cubic yard as required for road excavation.

The original ground elevation is not shown on the plans and it will be the contractor's responsibility to determine the elevations for pavement, base to meet the intent of the plans and specifications. Measurement for roadway excavation and embankment will be based on the original ground elevations.

2-03.4 Payment

Add the following:

"Roadway Excavation, Incl. Haul" shall include embankment compaction, excavation of asphalt on roadway, base material on road, material from the original ground elevation to subgrade as shown on the plans, and shall be included in the cubic yard cost. Removal of Structures and Obstructions will be paid as a separate bid item for hauling the asphalt offsite.

2-06 SUBGRADE PREPARATION

2-06.3 Construction Requirements

2-06.3(1) Subgrade for Surfacing

Add the following:

The road subgrade must consist of firm competent material and all soft or unstable soils shall be removed as determined by the City Engineer in the field.

The finished subgrade base surface may be subject to a proof-loading test using a fully loaded water truck or equivalent. The Contractor shall replace or reconstruct any failing areas marked by the Engineer until underlying firmness and top layer compaction are achieved. No additional pay will be made for achieving compaction. The placement of 3" minus aggregate base may be necessary to stabilize the subgrade that cannot be compacted as described below.

The contractor will need to employ Geotechnical testing company for required compaction tests as follows:

1. subgrade and base course 1 ¼" minus CSAB.
2. The testing company will also need to perform compaction testing on the new aggregate base and asphalt overlay and added asphalt for the reconstruction.
3. The testing company used by the contactor will need to meet City approval, and all reports and results of the tests will need to be submitted to the city for verification.

The Contractor shall replace or reconstruct any failing areas marked by the Geotechnical Testing Company or the City Engineer until underlying firmness and top layer compaction are achieved. Payment for compaction will be included in the bid items for construction of the as shown on the plans and no additional pay will be made for testing or achieving compaction.

2-06.3(2) Subgrade for Pavement

Add the following:

The material underneath the road shall be compacted to 95% density in the same manner and to the same degree as specified in Section 2-06.3(1) of WSDOT Standard Specifications.

2-06.5 Measurement and Payment

Section 2-06.5 is supplemented with the following:

The subgrade preparation and compaction under the roadway shall be included in the unit price for Roadway Excavation and Embankment.

2-07 WATERING

Add the following:

The Contractor shall obtain water at his expenses, in a legal manner. The Contractor may not obtain water from natural sources without permission from local authorities that have jurisdiction.

2-09.3(A) Staking, Cross-Sectioning and Inspecting

Add the following:

Staking: The City of La Center will mark the limits of parking lot excavation only. All other surveying will be provided by the contractor, and inspected by the city.

4-04.(5) Shaping and Compaction

Add the following:

The contractor will allow time for the City to inspect subgrade compaction prior to placement of the aggregate base.

Section 5-02, Bituminous Surface Treatment
5-02.2 Materials

Section 5-02.2 is supplemented with the following:

(******)

Slurry Seal-Bid Schedule D

Asphalt: The asphalt emulsion for slurry seal shall be a Quick Setting type LM-CQS-1H emulsified asphalt and shall conform to the following requirements:

Test on Emulsion	Test Method	Limits
Viscosity at 77 F., Saybolt-Furol, sec.	AASHTO T 59	15-100
Sieve Test, %	AASHTO T 59	≤ 0.10
Particle charge, Electroplate	AASHTO T 59	Positive
Residue by Distillation, %	AASHTO T 59	≥ 62
Softening point (ring & ball) degrees F	AASHTO T 53	≥ 130

Test on Residue	Test Method	Limits
Penetration, 77°F (25 °C), 100 g., 5 sec.	AASHTO T 49	40-80
Ductility at 77 °F (25 °C), 5 cm/min, cm	AASHTO T 51	≥ 25

Each load of emulsified asphalt shall be accompanied with a Certificate of Analysis/Compliance to assure that it is the same as that used in the mix design.

Polymer Latex: The emulsified asphalt shall be homogeneous and polymer modified. Polymer shall be co-milled with the emulsion solution containing a minimum of 3.0% latex solids content based on residual bitumen weight content, certified from the emulsion supplier for each load, along with any special quick-setting emulsifier agents.

Mineral Filler: Mineral filler, for example, Portland cement, hydrated lime, limestone dust, flyash or other approved filler, if required by the mix design, shall meet the requirements of ASTM D242. The type and amount, if necessary, shall be determined by the mix design.

Water: All water used with the slurry mixture shall be potable. The Contractor shall ensure that the water planned for use shall be compatible with the slurry mix. If the contractor elects to obtain water from fire hydrants, the contractor shall obtain, install and use an approved construction water meter and pay such fees and service charges as are normally charged by the water department.

Additives: Any material added to the slurry mixture or any of the component materials shall be approved by the Engineer prior to use, and the Contractor shall furnish a statement describing the additive, its purpose and quantity to be used.

The quantities of additives shall be initially predetermined by the mix design and field adjustments, if required, shall be approved by the Engineer. Liquid retardant (used with the Quick Set Emulsion) shall only be used if needed to improve workability of the mix.

Aggregate: The mineral aggregate used shall be manufactured crushed stone such as granite, slag, limestone, chat, or other high-quality aggregate, or combination thereof. To assure the material is totally crushed, 100 percent of the parent aggregate will be larger than the largest stone in the gradation to be used. The aggregate shall meet the following test requirements:

Los Angeles Wear, 500 REV (ASTM Designation C131)	$\leq 30\%$
Sand Equivalent (ASTM D2419)	≥ 65
Degradation Factor (WSDOT Test Method No. 113)	≥ 30
Soundness (ASTM C88)	$\leq 15\%$ using Na_2SO_4 or $\leq$ 25% using $MgSO_4$

The finished product shall be clean, uniform in quality and free from wood, bark, roots and other deleterious materials.

It may be necessary during stockpiling to add blending sand or filler to improve the grading of the mineral aggregate. For this purpose only, crushed fines from the aggregate source may be used but only in the minimum amount needed for optimum mix design and workability.

When tested in accordance with ASTM Designation D2419, the total aggregate blend shall have a sand equivalent of not less than 65. The aggregate shall consist of 100% crushed rock. The combined mineral aggregate including blending sand and fillers, but not Portland cement, shall conform to the following grading limits.

Sieve Size	Percent Passing/TYPE II	Percent Passing/TYPE III

Sieve Size	Percent Passing/TYPE II	Percent Passing/TYPE III
3/8”	100	100
No. 4	90-100	70-90
No. 8	65-90	45-70
No. 16	45-70	28-50
No. 30	30-50	19-34
No. 50	18-30	12-25
No. 100	10-21	7-18
No. 200	5-15	5-15

Residual Asphalt
% by Weight of Dry Aggregate 7.5-13.5 Type II
6.5-12.0 Type III

Mix Design: A minimum of 14 calendar days prior to accomplishing any slurry sealing, the Contractor shall submit a signed original of a mix design for approval by the Engineer. The mix design shall be developed using the specific materials for this project. Previous mix designs shall not be accepted unless authorized by the Engineer. Once the materials are approved, no substitution will be permitted unless first tested and approved by the laboratory preparing the mix design.

The design shall be performed in accordance with International Slurry Surfacing Association (ISSA) Technical Bulletin No. 111 “Outline Guide Procedure for Slurry Seal”. The mix design shall be developed such that the treated area will be opened to traffic within 2 to 3 hours after placement of the slurry seal mixture.

The following laboratories are pre-approved for performing the mix design:

Petroleum Sciences
North 4817 Freya #3 (UPS)
P.O. Box 6304
Spokane, WA 99207
(509) 489-1758
Contact: Bob Dunning

Akzo Nobel Chemicals Inc.
Asphalt Applications
7101 Adams Street
Willowbrook, Illinois 60521
(630) 288-2922
Contact: Tony Ng

Other laboratories may be approved by the Engineer if they have the capability to perform the required tests and demonstrate satisfactory experience performing slurry seal mix designs.

As a minimum, the mix design report shall include the following information:

Aggregates:
Results of Quality tests (Los Angeles Wear, Sand Equivalent, etc.)
Gradation

Asphalt:
Results of Specification tests

Design quantity as a percentage by weight of dry aggregate
Water:
Percentage by weight of dry aggregate (Report design quantity and minimum and maximum limits)

Mineral Filler (if necessary):
Type to be used
Percentage by weight of dry aggregate (Report design quantity and minimum and maximum limits)

Additives (if necessary):
Type to be used
Percentage by weight of dry aggregate (Report design quantity and minimum and maximum limits)

Results of Tests on Slurry Seal Mixtures:

ISSA Test No.	Description	Specification
ISSA TB106	Slurry Seal Consistency	2-3 cm
ISSA TB 139	Wet Cohesion 30 Minutes Min (Set) Wet Cohesion 60 Minutes Min	≥ 12 kg-cm ≥ 20 kg-cm (or near spin)
ISSA TB 109	Excess Asphalt by LWT Sand Adhesion	≤ 50g/sq. ft.
ISSA TB 114	Wet Stripping	Pass (≥ 90%)
ISSA TB 100	Wet-Track Abrasion Loss, One-hour Soak Wet-Track Abrasion Loss, Six-hour Soak	≤ 75 grams/sq. ft. (Report for information only)
ISSA TB 113	Mix Time*	Controllable to 180 Seconds Minimum

* The mixing test and set time test should be done at the highest temperatures expected during construction.

The laboratory report shall include the quantitative effects of moisture content on the unit weight of the aggregate. In addition to the laboratory report, abraded and unabraded slurry test samples shall be submitted by the contractor from the Wet Track Abrasion Test.

Slurry seal shall be applied per 5-02.3(3)

5-04 HOT MIX ASPHALT

5-04.1 Hot Mix Asphalt

Add the following:

Any reference in the Plans or Specifications to Asphalt Concrete Pavement, ACP, or AC shall be equivalent to the terms Hot Mix Asphalt or HMA. The grade of the asphalt shall be ½" PG-58H-22 per WSDOT specifications. The contractor shall supply and place HMAC in accordance with WSDOT specifications. Compaction requirements: The in-place pavement density shall be at least 92% of theoretical maximum per WSDOT FOP

for AASHTO T 209. Surface smoothness will be measured for acceptance according to Section 5-04.3(13).

5.04.3 Construction Requirements

Add the following:

The Contractor shall tack and sand all edges, cold joints, and tapers which join existing asphalt pavement with new asphalt. Paving mat and asphalt binder shall be completed in accordance with sections 5-04.3(14) and 9-33 of these specifications. The cons of the binder under the asphalt overlay and tacking the edges will be included in the cost of the HMA placement.

5-04.3(5)E Pavement Repair

Sawcutting and Removal
The Contractor shall remove the existing pavement and base of the drive aisle following sawcutting of the existing pavement or curb, vertically and in a straight line along the cut lines marked in the field. The cuts shall be made a sufficient distance from the area of excavation to remove damaged pavement and expose voids under the pavement where the subgrade has subsided, or where the pavement has broken or cracked. Pavement edges on opposite sides of trenches shall be cut parallel to each other.

5-04.3(8) A1 General

The third paragraph is revised to read:

Nonstatistical evaluation will be used for the acceptance of HMA when the Proposal quantities for a class of HMA, with the same PG grade of asphalt binder, are 4,000-tons or less.

7-04 STORM SEWERS

7-04.2 Description

Add the following:

All perforated Storm Sewer Pipe designated on the plans shall be HDPE AASHTO M294 TYPE S OR D or ASTM D 3034 SDR 35 PVC.

7-04.3 (1)A General

Add the following:

While the Engineer reserves the right to make additional tests for cause, it is not anticipated that exfiltration, air pressure testing, or deflection testing will be required

7-04.4 Measurement
The length of the perforated storm sewer pipe shall be measured by lineal foot of actual pipe placed, including vertical pipe and includes materials, labor and installation. The installation of the perforated pipe, includes perforated pipe includes the pipe bends, fittings, plug and concrete valve box.

7-04.5 Payment

Add the following:

"Storm Sewer Pipe, 6" (In). Diam." perforated, per linear foot
"Storm Sewer Pipe, 6" (In.) Diam", per lineal foot
"Storm sewer cleanout, measured EA.

The unit contract price per linear foot for Storm Sewer Pipe of the kind and size specified shall include all costs for furnishing and installing the pipe, including excavation, pipe zone, compaction, testing, connections to existing pipes, plugs for pipe branches, pipe bends, cleanouts and stubs that are not being connected to the system on this project, and beveling or other end treatments required.

7-05 MANHOLES, INLETS, CATCH BASINS, AND DRYWELLS

7-05.2 Materials

Add the following:

Add the following section:

7-10 Adjust water and gas valves to finished grade

All water, gas and other miscellaneous valves shall be adjusted to finished grade as approved by the utility company.
It will be the responsibility of the contractor to coordinate with each utility company responsible to relocate the facility, to ensure that the conflicting utility riser is moved before construction.
Potholing existing utilities will be incidental reconstruction of the road and installation of the subsurface storm drain.

Measurement and Payment
Adjustment of water, gas and miscellaneous valves will be measured and paid as each per the plans and will include all materials and labor to complete the item with approval by the utility company.

8-01 EROSION CONTROL AND WATER POLLUTION CONTROL

8-01.1 Erosion Control and Water Pollution Control

Section 8-01.1 is supplemented with the following:

Best Management Practice (BMP) means physical, structural, and managerial practices that when used singly or in combination prevent or reduce erosion.

8-01.3 Construction Requirements

Section 8-01.3 is supplemented with the following:

Erosion Control
It is the Contractor's responsibility to maintain and monitor all erosion control BMP's and contain and correct any hazardous spills. If the Engineer notes a spill or a BMP that is failing and informs the Contractor of the failure, the Contractor shall correct the problem within 24 hours. There is an item for inlet protection, silt fence and construction entrance to be used to place this protection as necessary to prevent sediment from entering the storm system. This item will be paid by lump sum.

8-01.3(1) C Water Management

Add the following:

If groundwater is encountered during excavation of the pavement and subgrade, the contractor shall dewater the subgrade to install the drain rock, base and ballast as necessary. The dewatering shall be included in the cost of installation of the improvements and no additional payment will be made for dewatering.

8-01.3(2) B Seeding and Fertilizing
Add the following:

Seed shall be applied in all disturbed areas outside of the roadway and shall be applied to established ground cover to match the existing ground cover.

8-02 ROADSIDE RESTORATION

8-02.2 Material

Add the following:

During excavation of the existing sidewalk and ramps, as shown on the plans, it may be necessary to replace existing vegetation removed. If that is necessary, it may be necessary to place new top soil and seed with lawn, as well as bark dust. The bioswale excavated shall be seeded with lawn.

Topsoil, Type A- Imported friable loam/sand loam from the top layer of existing soils not previously excavated. If existing soils are unavailable an off-site source is acceptable as long as it meets these requirements. Topsoil shall be free of rocks over 1", clods, debris, materials toxic to vegetation and other deleterious materials. Submit sample and source for approval prior to use.

The composition shall meet the following requirements:

50% to 80 %	sandy loam
10% to 20 %	clay
10% to 20 %	composted organic material (excluding animal waste)

8-14 Cement Concrete Sidewalks

8-14.1 Description

Add the following note:

Work consists of cement concrete sidewalks and ramps. The ramps shall include installation of handicap parking signs.

Measurement and Payment

Payment will be made for the following bid items

- Cement concrete sidewalk will be measured and paid per square yard (SY)
- Cement Concrete ramps and handicap parking signs, will be measured and paid per square yard (SY)

9-03 Aggregates

9-03.09(3) Crushed Surfacing

Add the following note:
9-03.9(3) Crushed Surfacing

Crushed surface base course depth and installation per section 9-03.9(3) shall be supplied

and installed per the contract drawings.

The aggregate base used above the compacted subgrade, shall be 1 ¼" minus crushed surface aggregate base (CSAB) and shall be installed per WSDOT section 9-03.09(3).

Measurement and Payment

Aggregate base will be measured and paid by ton and includes materials, placement and compaction per the plans and paid by tons.

9-03.12(5) Gravel Backfill for Drywells

Add the following note:

Gravel backfill for drywells shall be used in the perforated pipe trench drain installation at locations shown on the plans and as indicated in the section details. The drywell rock shall be installed per WSDOT section 9-03.12(5).

The perforated pipe trench drain includes geotextile fabric. The installation of the trench drain includes placement of the drainage fabric as described on the plans. The fabric shall be Mirafi 140 N or approved equal.

Measurement and Payment

Gravel backfill for drywells shall be measured and paid per ton and shall include all materials, including the geotextile fabric placed in place per the plans and details.

9-33 Construction Geosynthetic

Geotextile soil separation between subgrade and aggregate base or ballast as described on the plans for subgrade separation shall consist of Woven Fabric for Separation per table 3 section 9-33.2(1) of WSDOT specifications. In addition, Geogrid may be necessary for subgrade stabilization as described per section 9-03.12(5). The type of Geogrid may be either Tensar BX biaxial or Tensar TX triaxial or approved equal per the city.

Geotextile soil separation fabric as described on the plans shall consist of Nonwoven Fabric 9-33.2(1) of WSDOT specifications. The fabric shall be Mirafi 140 N or approved equal.

Measurement and Payment:

Payment for geosynthetic fabric and Geogrid shall be measured per square yard and shall be paid for as installed. Geosynthetic fabric and Geogrid be paid by square yard and shall include all labor and materials to install in place per the plans and specifications.

STANDARD PLANS

The State of Washington Standard Plans for Road, Bridge and Municipal Construction M41-10, effective 2022 is made a part of this contract.

The Standard Plans
All references in the Standard Plans to "Asphalt Concrete Pavement" shall be revised to read "Hot Mix Asphalt".

All references in the Standard Plans to the abbreviation "ACP" shall be revised to read "HMA".

PART IV- CONTRACT DRAWINGS

City of La Center Paving Plans
Sheet No.

Sheet No.

1	**TTL**	**COVER SHEET**
2	**L2 –**	**NOTESAND INADVERTENT DISCOVERY**
3	**C1 –**	**PAVING PLAN SHEET**
4	**C2-**	**STRIPING PLAN**
5	**C3**	**STORM DRAIN-BIOSWALE PLAN**
6	**C4**	**RAMP DETAIL SHEET 1**
7	**C5**	**RAMP DETAIL SHEET 2**
8	**C6**	**GREASE INTERCEPTOR PLAN**
9	**C7**	**SECTION 1**
10	**C8**	**SECTION 2**
11	**C9**	**CITY DETAIL SHEET 1**
12	**C10**	**CITY DETAIL SHEET 2**
13	**C11**	**EROSION CONTROL DETAIL SHEET**

SPECIFICATIONS for Kitchen Remodel
Entitled "Project Manual for City of La Center Community Center Kitchen Remodel"
By Collins Architecture

SET NO:_____

PROJECT MANUAL

Project:

CITY OF LA CENTER

COMMUNITY CENTER KITCHEN REMODEL

PROJECT NO. 2022-09

July 20, 2022

COLLINS
ARCHITECTURAL GROUP, P.S.

950 12TH AVE., SUITE 200, LONGVIEW, WA 98632
PHONE (360) 425 0000

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TECHNICAL SPECIFICATION

Project Title: City of La Center
Community Center Kitchen Remodel

Date: July 20, 2022

Client Agency: City of La Center

Architect:
Collins Architectural Group, p.s.
950 12th Avenue, Suite 200
Longview, WA 98632
(360) 425-0000
Contact: Craig Collins
e-mail: craigc@collinsarchgroup.com

SECTION 02 4100
DEMOLITION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Selective demolition of building elements for alteration purposes.

1.02 RELATED REQUIREMENTS

A. Section 01 6000 - Product Requirements: Handling and storage of items removed for salvage and relocation.

B. Section 01 7000 - Execution and Closeout Requirements: Project conditions; protection of bench marks, survey control points, and existing construction to remain; reinstallation of removed products; temporary bracing and shoring.

1.03 QUALITY ASSURANCE

A. Demolition Firm Qualifications: Company specializing in the type of work required.
   1. Minimum of 3 years of documented experience.

PART 2 PRODUCTS -- NOT USED

PART 3 EXECUTION

3.01 GENERAL PROCEDURES AND PROJECT CONDITIONS

A. Comply with applicable codes and regulations for demolition operations and safety of adjacent structures and the public.
   1. Obtain required permits.
   2. Take precautions to prevent catastrophic or uncontrolled collapse of structures to be removed; do not allow worker or public access within range of potential collapse of unstable structures.
   3. Provide, erect, and maintain temporary barriers and security devices.
   4. Conduct operations to minimize effects on and interference with adjacent structures and occupants.
   5. Do not close or obstruct roadways or sidewalks without permit.
   6. Conduct operations to minimize obstruction of public and private entrances and exits; do not obstruct required exits at any time; protect persons using entrances and exits from removal operations.
   7. Obtain written permission from owners of adjacent properties when demolition equipment will traverse, infringe upon or limit access to their property.

B. Do not begin removal until receipt of notification to proceed from Owner.

C. Protect existing structures and other elements that are not to be removed.
   1. Provide bracing and shoring.
   2. Prevent movement or settlement of adjacent structures.
   3. Stop work immediately if adjacent structures appear to be in danger.

D. Minimize production of dust due to demolition operations; do not use water if that will result in ice, flooding, sedimentation of public waterways or storm sewers, or other pollution.

E. If hazardous materials are discovered during removal operations, stop work and notify Architect and Owner; hazardous materials include regulated asbestos containing materials, lead, PCB's, and mercury.

3.02 EXISTING UTILITIES

A. Coordinate work with utility companies; notify before starting work and comply with their requirements; obtain required permits.

B. Protect existing utilities to remain from damage.

C. Do not disrupt public utilities without permit from authority having jurisdiction.

D. Do not close, shut off, or disrupt existing life safety systems that are in use without at least 7 days prior written notification to Owner.

E. Do not close, shut off, or disrupt existing utility branches or take-offs that are in use without at least 3 days prior written notification to Owner.

F. Locate and mark utilities to remain; mark using highly visible tags or flags, with identification of utility type; protect from damage due to subsequent construction, using substantial barricades if necessary.

G. Remove exposed piping, valves, meters, equipment, supports, and foundations of disconnected and abandoned utilities.

3.03 SELECTIVE DEMOLITION FOR ALTERATIONS

A. Drawings showing existing construction and utilities are based on casual field observation and existing record documents only.
   1. Verify that construction and utility arrangements are as indicated.
   2. Report discrepancies to Architect before disturbing existing installation.
   3. Beginning of demolition work constitutes acceptance of existing conditions that would be apparent upon examination prior to starting demolition.

B. Remove existing work as indicated and as required to accomplish new work.
   1. Remove items indicated on drawings.

C. Services (Including but not limited to HVAC, Plumbing, Fire Protection, Electrical, Telecommunications, and _____): Remove existing systems and equipment as indicated.
   1. Maintain existing active systems that are to remain in operation; maintain access to equipment and operational components.
   2. Where existing active systems serve occupied facilities but are to be replaced with new services, maintain existing systems in service until new systems are complete and ready for service.
   3. Verify that abandoned services serve only abandoned facilities before removal.
   4. Remove abandoned pipe, ducts, conduits, and equipment, including those above accessible ceilings; remove back to source of supply where possible, otherwise cap stub and tag with identification.

D. Protect existing work to remain.
   1. Prevent movement of structure; provide shoring and bracing if necessary.
   2. Perform cutting to accomplish removals neatly and as specified for cutting new work.
   3. Repair adjacent construction and finishes damaged during removal work.
   4. Patch as specified for patching new work.

3.04 DEBRIS AND WASTE REMOVAL

A. Remove debris, junk, and trash from site.

B. Leave site in clean condition, ready for subsequent work.

C. Clean up spillage and wind-blown debris from public and private lands.

END OF SECTION

SECTION 03 3000
CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Floors and slabs on grade.

B. Concrete reinforcement.

C. Concrete curing.

1.02 RELATED REQUIREMENTS

A. Section 07 9200 - Joint Sealants: Products and installation for sealants and joint fillers for saw cut joints and isolation joints in slabs.

1.03 REFERENCE STANDARDS

A. ACI 301 - Specifications for Concrete Construction; 2020.

B. ACI 302.1R - Guide to Concrete Floor and Slab Construction; 2015.

C. ACI 304R - Guide for Measuring, Mixing, Transporting, and Placing Concrete; 2000 (Reapproved 2009).

D. ACI 308R - Guide to External Curing of Concrete; 2016.

E. ACI 318 - Building Code Requirements for Structural Concrete; 2019, with Errata (2021).

F. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement; 2020.

G. ASTM C33/C33M - Standard Specification for Concrete Aggregates; 2018.

H. ASTM C150/C150M - Standard Specification for Portland Cement; 2021.

I. ASTM C1602/C1602M - Standard Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete; 2012.

J. ASTM E1643 - Standard Practice for Selection, Design, Installation and Inspection of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs; 2018a.

K. ASTM E1745 - Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs; 2017.

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements for submittal procedures.

B. Mix Design: Submit proposed concrete mix design.
   1. Indicate proposed mix design complies with requirements of ACI 301, Section 4 - Concrete Mixtures.
   2. Indicate proposed mix design complies with requirements of ACI 318, Chapter 5 - Concrete Quality, Mixing and Placing.

C. Samples: Submit samples of underslab vapor retarder to be used.

1.05 QUALITY ASSURANCE

A. Perform work of this section in accordance with ACI 301 and ACI 318.

PART 2 PRODUCTS

2.01 REINFORCEMENT MATERIALS

A. Reinforcing Steel: ASTM A615/A615M, Grade 60 (60,000 psi) (420 MPa).
   1. Type: Deformed billet-steel bars.
   2. Finish: Unfinished, unless otherwise indicated.

B. Reinforcement Accessories:
   1. Tie Wire: Annealed, minimum 16 gauge, 0.0508 inch (1.29 mm).

2.02 CONCRETE MATERIALS

A. Cement: ASTM C150/C150M, Type I - Normal Portland type.

B. Fine and Coarse Aggregates: ASTM C33/C33M.

C. Water: ASTM C1602/C1602M; clean, potable, and not detrimental to concrete.

2.03 ACCESSORY MATERIALS

A. Underslab Vapor Retarder:
   1. Accessory Products: Vapor retarder manufacturer's recommended tape, adhesive, mastic, prefabricated boots, etc., for sealing seams and penetrations.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify lines, levels, and dimensions before proceeding with work of this section.

3.02 PREPARATION

A. Interior Slabs on Grade: Install vapor retarder under interior slabs on grade. Comply with ASTM E1643. Lap joints minimum 6 inches (150 mm). Seal joints, seams and penetrations watertight with manufacturer's recommended products and follow manufacturer's written instructions. Repair damaged vapor retarder before covering.

3.03 INSTALLING REINFORCEMENT AND OTHER EMBEDDED ITEMS

A. Comply with requirements of ACI 301. Clean reinforcement of loose rust and mill scale, and accurately position, support, and secure in place to achieve not less than minimum concrete coverage required for protection.

3.04 PLACING CONCRETE

A. Place concrete in accordance with ACI 304R.

3.05 CONCRETE FINISHING

A. Concrete Slabs: Finish to requirements of ACI 302.1R, and as follows:
   1. Surfaces to Receive Thin Floor Coverings: "Steel trowel" as described in ACI 302.1R; thin floor coverings include carpeting, resilient flooring, seamless flooring, resinous matrix terrazzo, thin set quarry tile, and thin set ceramic tile.
   2. Other Surfaces to Be Left Exposed: Trowel as described in ACI 302.1R, minimizing burnish marks and other appearance defects.

3.06 CURING AND PROTECTION

A. Comply with requirements of ACI 308R. Immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures, and mechanical injury.

B. Maintain concrete with minimal moisture loss at relatively constant temperature for period necessary for hydration of cement and hardening of concrete.

3.07 DEFECTIVE CONCRETE

A. Defective Concrete: Concrete not complying with required lines, details, dimensions, tolerances or specified requirements.

END OF SECTION

SECTION 05 5133
METAL LADDERS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Shop-fabricated metal ladders.

1.02 REFERENCE STANDARDS

A. ANSI A14.3 - American National Standard for Ladders -- Fixed -- Safety Requirements; 2008 (Reaffirmed 2018).

B. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2017.

C. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless; 2020.

D. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2016a.

1.03 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Shop Drawings:
   1. Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories. Include erection drawings, elevations, and details where applicable.

PART 2 PRODUCTS

2.01 FABRICATED LADDERS

A. Ladders: Steel; in compliance with ANSI A14.3; with mounting brackets and attachments; prime paint finish.
   1. Side Rails: 3/8 by 2 inches (9 by 50 mm) members spaced at 20 inches (500 mm).
   2. Rungs: One inch (25 mm) diameter solid round bar spaced 12 inches (300 mm) on center.
   3. Space rungs 7 inches (175 mm) from wall surface.

2.02 FINISHES - STEEL

A. Galvanizing of Structural Steel Members: Galvanize after fabrication to ASTM A123/A123M requirements. Provide minimum 1.7 oz/sq ft galvanized coating. (Provide minimum 530 g/sq m galvanized coating.)

B. Galvanizing of Non-structural Items: Galvanize after fabrication to ASTM A123/A123M requirements.

2.03 FABRICATION TOLERANCES

A. Squareness: 1/8 inch (3 mm) maximum difference in diagonal measurements.

B. Maximum Offset Between Faces: 1/16 inch (1.5 mm).

C. Maximum Misalignment of Adjacent Members: 1/16 inch (1.5 mm).

D. Maximum Bow: 1/8 inch (3 mm) in 48 inches (1.2 m).

E. Maximum Deviation From Plane: 1/16 inch (1.5 mm) in 48 inches (1.2 m).

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that field conditions are acceptable and are ready to receive work.

3.02 INSTALLATION

A. Install items plumb and level, accurately fitted, free from distortion or defects.

B. Provide for erection loads, and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.

C. Obtain approval prior to site cutting or making adjustments not scheduled.

3.03 TOLERANCES

A. Maximum Variation From Plumb: 1/4 inch (6 mm) per story, non-cumulative.

B. Maximum Offset From True Alignment: 1/4 inch (6 mm).

C. Maximum Out-of-Position: 1/4 inch (6 mm).

END OF SECTION

SECTION 06 1000
ROUGH CARPENTRY

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Structural dimension lumber framing.

B. Nonstructural dimension lumber framing.

C. Rough opening framing for doors, windows, and roof openings.

D. Sheathing.

E. Roof-mounted curbs.

F. Roofing nailers.

G. Preservative treated wood materials.

H. Miscellaneous framing and sheathing.

I. Concealed wood blocking, nailers, and supports.

J. Miscellaneous wood nailers, furring, and grounds.

K. Roof sheathing with factory applied roofing underlayment.

1.02 RELATED REQUIREMENTS

A. Section 07 2500 - Weather Barriers: Water-resistive barrier over sheathing.

1.03 REFERENCE STANDARDS

A. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2016a.

B. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2020.

C. AWC (WFCM) - Wood Frame Construction Manual for One- and Two-Family Dwellings; 2018.

D. AWPA U1 - Use Category System: User Specification for Treated Wood; 2021.

E. PS 2 - Performance Standard for Wood Structural Panels; 2018.

F. PS 20 - American Softwood Lumber Standard; 2020.

G. WCLIB (GR) - Standard Grading Rules for West Coast Lumber No. 17; 2018.

1.04 DELIVERY, STORAGE, AND HANDLING

A. General: Cover wood products to protect against moisture. Support stacked products to prevent deformation and to allow air circulation.

PART 2 PRODUCTS

2.01 GENERAL REQUIREMENTS

A. Dimension Lumber: Comply with PS 20 and requirements of specified grading agencies.
   1. Species: Douglas Fir-Larch, unless otherwise indicated.

2.02 DIMENSION LUMBER FOR CONCEALED APPLICATIONS

A. Grading Agency: West Coast Lumber Inspection Bureau; WCLIB (GR).

B. Sizes: Nominal sizes as indicated on drawings, S4S.

C. Moisture Content: S-dry or MC19.

D. Stud Framing (2 by 2 through 2 by 6 (50 by 50 mm through 50 by 150 mm)):
   1. Species: Douglas Fir-Larch.
   2. Grade: No. 2.

E. Joist, Rafter, and Small Beam Framing (2 by 6 through 4 by 16 (50 by 150 mm through 100 by 400 mm)):
   1. Machine stress-rated (MSR) as follows:
      a. Fb-single; minimum extreme fiber stress in bending: 1350 psi (9,300 kPa).
      b. E; minimum modulus of elasticity: 1,300,000 psi (8960 MPa).
   2. Species: Douglas Fir-Larch.

F. Miscellaneous Framing, Blocking, Nailers, Grounds, and Furring:
   1. Lumber: S4S, No. 2 or Standard Grade.
   2. Boards: Standard or No. 3.

2.03 CONSTRUCTION PANELS

A. Subfloor/Underlayment Combination: PS 2 type, rated Single Floor.
   1. Bond Classification: Exterior.
   2. Span Rating: 48.
   3. Performance Category: 1-1/8 PERF CAT.

B. Wall Sheathing: PS 2 type.
   1. Bond Classification: Exterior.
   2. Grade: Structural I Sheathing.
   3. Span Rating: 24.
   4. Performance Category: 1/2 PERF CAT.
   5. Edge Profile: Square edge.

2.04 ACCESSORIES

A. Fasteners and Anchors:
   1. Metal and Finish: Hot-dipped galvanized steel complying with ASTM A153/A153M for high humidity and preservative-treated wood locations, unfinished steel elsewhere.

B. Die-Stamped Connectors: Hot dipped galvanized steel, sized to suit framing conditions.
   1. For contact with preservative treated wood in exposed locations, provide minimum G185 (Z550) galvanizing complying with ASTM A653/A653M.

C. Water-Resistive Barrier: See Section 07 2500.

2.05 FACTORY WOOD TREATMENT

A. Treated Lumber and Plywood: Comply with requirements of AWPA U1 - Use Category System for wood treatments determined by use categories, expected service conditions, and specific applications.
   1. Preservative-Treated Wood: Provide lumber and plywood marked or stamped by an ALSC-accredited testing agency, certifying level and type of treatment in accordance with AWPA standards.

B. Preservative Treatment:
   1. Preservative Pressure Treatment of Lumber Above Grade: AWPA U1, Use Category UC3B, Commodity Specification A using waterborne preservative.
      a. Kiln dry lumber after treatment to maximum moisture content of 19 percent.
      b. Treat lumber in contact with masonry or concrete.
      c. Treat lumber less than 8 inches above grade.

PART 3 EXECUTION

3.01 PREPARATION

A. Coordinate installation of rough carpentry members specified in other sections.

3.02 INSTALLATION - GENERAL

A. Select material sizes to minimize waste.

B. Reuse scrap to the greatest extent possible; clearly separate scrap for use on site as accessory components, including: shims, bracing, and blocking.

C. Where treated wood is used on interior, provide temporary ventilation during and immediately after installation sufficient to remove indoor air contaminants.

3.03 FRAMING INSTALLATION

A. Set structural members level, plumb, and true to line. Discard pieces with defects that would lower required strength or result in unacceptable appearance of exposed members.

B. Make provisions for temporary construction loads, and provide temporary bracing sufficient to maintain structure in true alignment and safe condition until completion of erection and installation of permanent bracing.

C. Install structural members full length without splices unless otherwise specifically detailed.

D. Comply with member sizes, spacing, and configurations indicated, and fastener size and spacing indicated, but not less than required by applicable codes, AWC (WFCM) Wood Frame Construction Manual, and _____.

E. Install horizontal spanning members with crown edge up and not less than 1-1/2 inches (38 mm) of bearing at each end.

F. Construct double joist headers at floor and ceiling openings and under wall stud partitions that are parallel to floor joists; use metal joist hangers unless otherwise detailed.

G. Frame wall openings with two or more studs at each jamb; support headers on cripple studs.

3.04 BLOCKING, NAILERS, AND SUPPORTS

A. Provide framing and blocking members as indicated or as required to support finishes, fixtures, specialty items, and trim.

B. In walls, provide blocking attached to studs as backing and support for wall-mounted items, unless item can be securely fastened to two or more studs or other method of support is explicitly indicated.

C. Provide the following specific nonstructural framing and blocking:
   1. Cabinets and shelf supports.
   2. Wall brackets.
   3. Ktchen accessories.
   4. Joints of rigid wall coverings that occur between studs.

3.05 ROOF-RELATED CARPENTRY

A. Coordinate installation of roofing carpentry with deck construction, framing of roof openings, and roofing assembly installation.

3.06 INSTALLATION OF CONSTRUCTION PANELS

A. Subflooring/Underlayment Combination: At equipment platform Glue and nail to framing; staples are not permitted.

B. Roof Sheathing: Secure panels with long dimension perpendicular to framing members, with ends staggered and over firm bearing.
   1. Nail panels to framing; staples are not permitted.

C. Wall Sheathing: Secure with long dimension perpendicular to wall studs, with ends over firm bearing and staggered, using nails, screws, or staples.
   1. Place water-resistive barrier horizontally over wall sheathing, weather lapping edges and ends.

3.07 TOLERANCES

A. Framing Members: 1/4 inch (6 mm) from true position, maximum.

B. Variation from Plane, Other than Floors: 1/4 inch in 10 feet (2 mm/m) maximum, and 1/4 inch in 30 feet (7 mm in 10 m) maximum.

3.08 CLEANING

A. Waste Disposal: See Section 01 7419 - Construction Waste Management and Disposal.
   1. Comply with applicable regulations.
   2. Do not burn scrap on project site.
   3. Do not burn scraps that have been pressure treated.
   4. Do not send materials treated with pentachlorophenol, CCA, or ACA to co-generation facilities or “waste-to-energy” facilities.

B. Do not leave wood, shavings, sawdust, etc. on the ground or buried in fill.

C. Prevent sawdust and wood shavings from entering the storm drainage system.

END OF SECTION

SECTION 06 2000
FINISH CARPENTRY

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Finish carpentry items.

B. Wood casings and moldings.

C. Hardware and attachment accessories.

1.02 RELATED REQUIREMENTS

A. Section 06 1000 - Rough Carpentry: Support framing, grounds, and concealed blocking.

B. Section 06 4100 - Architectural Wood Casework: Shop fabricated custom cabinet work.

1.03 REFERENCE STANDARDS

A. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards, 2nd Edition; 2014, with Errata (2016).

B. AWMAC/WI (NAAWS) - North American Architectural Woodwork Standards; 2021, with Errata.

C. BHMA A156.9 - Cabinet Hardware; 2020.

D. PS 1 - Structural Plywood; 2009 (Revised 2019).

1.04 DELIVERY, STORAGE, AND HANDLING

A. Deliver factory-fabricated units to project site in original packages, containers or bundles bearing brand name and identification.

B. Store finish carpentry items under cover, elevated above grade, and in a dry, well-ventilated area not exposed to heat or sunlight.

C. Protect from moisture damage.

D. Handle materials and products to prevent damage to edges, ends, or surfaces.

PART 2 PRODUCTS

2.01 FINISH CARPENTRY ITEMS

A. Quality Standard: Custom Grade, in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), unless noted otherwise.

B. Interior Woodwork Items:

1. Moldings, Bases, Casings, and Miscellaneous Trim: Clear white pine; prepare for paint finish.

2.02 FASTENINGS

A. Adhesive for Purposes Other Than Laminate Installation: Suitable for the purpose; not containing formaldehyde or other volatile organic compounds.

2.03 ACCESSORIES

A. Adhesive: Type recommended by fabricator to suit application.

B. Primer: Alkyd primer sealer.

C. Wood Filler: Solvent base, tinted to match surface finish color.

2.04 FABRICATION

A. Shop assemble work for delivery to site, permitting passage through building openings.

B. When necessary to cut and fit on site, provide materials with ample allowance for cutting. Provide trim for scribing and site cutting.

2.05 SHOP FINISHING

A. Sand work smooth and set exposed nails and screws.

B. Apply wood filler in exposed nail and screw indentations.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify adequacy of backing and support framing.

B. Verify mechanical, electrical, and building items affecting work of this section are placed and ready to receive this work.

3.02 INSTALLATION

A. Install custom fabrications in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS) requirements for grade indicated.

B. Set and secure materials and components in place, plumb and level.

C. Carefully scribe work abutting other components, with maximum gaps of 1/32 inch (0.79 mm). Do not use additional overlay trim to conceal larger gaps.

3.03 PREPARATION FOR SITE FINISHING

A. Set exposed fasteners. Apply wood filler in exposed fastener indentations. Sand work smooth.

END OF SECTION

SECTION 06 4100
ARCHITECTURAL WOOD CASEWORK

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Specially fabricated cabinet units.

B. Countertops.

C. Hardware.

D. Factory finishing.

E. Preparation for installing utilities.

1.02 RELATED REQUIREMENTS

A. Section 06 1000 - Rough Carpentry: Support framing, grounds, and concealed blocking.

B. Section 09 9123 - Interior Painting: Field finishing of cabinet exterior.

1.03 REFERENCE STANDARDS

A. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards, 2nd Edition; 2014, with Errata (2016).

B. AWMAC/WI (NAAWS) - North American Architectural Woodwork Standards; 2021, with Errata.

C. NEMA LD 3 - High-Pressure Decorative Laminates; 2005.

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements for submittal procedures.

B. Shop Drawings: Indicate materials, component profiles, fastening methods, jointing details, and accessories.
   1. Scale of Drawings: 1-1/2 inch to 1 foot (125 mm to 1 m), minimum.

C. Product Data: Provide data for hardware accessories.

1.05 QUALITY ASSURANCE

A. Fabricator Qualifications: Company specializing in fabricating the products specified in this section with minimum five years of documented experience.
   1. Company with at least one project in the past 5 years with value of woodwork within 20 percent of cost of woodwork for this Project.
   2. Single Source Responsibility: Provide and install this work from single fabricator.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Protect units from moisture damage.

PART 2 PRODUCTS

2.01 CABINETS

A. Quality Standard: Custom Grade, in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), unless noted otherwise.

B. Plastic Laminate Faced Cabinets: Custom grade.

C. Cabinets at serving counter:
   1. Finish - Exposed Interior Surfaces: Decorative laminate.
   2. Finish - Semi-Exposed Surfaces: Melamine.
   3. Finish - Concealed Surfaces: Melamine.
   4. Door and Drawer Front Edge Profiles: Square edge with thin applied band.
   5. Casework Construction Type: Type A - Frameless.
   6. Cabinet Style: Flush overlay.

7. Cabinet Doors and Drawer Fronts: Flush style.

2.02 LAMINATE MATERIALS

A. Manufacturers:
   1. Formica Corporation; ____: www.formica.com/#sle.
   2. Wilsonart LLC; ____: www.wilsonart.com/#sle.
   3. Substitutions: See Section 01 6000 - Product Requirements.

B. High Pressure Decorative Laminate (HPDL): NEMA LD 3, types as recommended for specific applications.

2.03 COUNTERTOPS

A. Stainless Steel Countertops: See Section 11 4000

2.04 ACCESSORIES

A. Adhesive: Type recommended by fabricator to suit application.

B. Plastic Edge Banding: Extruded PVC, convex shaped; smooth finish; self locking serrated tongue; of width to match component thickness.

C. Fasteners: Size and type to suit application.

D. Bolts, Nuts, Washers, Lags, Pins, and Screws: Of size and type to suit application; galvanized or chrome-plated finish in concealed locations and stainless steel or chrome-plated finish in exposed locations.

E. Grommets: Standard plastic, painted metal, or rubber grommets for cut-outs, in color to match adjacent surface.

2.05 HARDWARE

A. Sliding Door Pulls: Circular shape for recessed installation, steel with satin finish.

2.06 FABRICATION

A. Assembly: Shop assemble cabinets for delivery to site in units easily handled and to permit passage through building openings.

B. Edging: Fit shelves, doors, and exposed edges with specified edging. Do not use more than one piece for any single length.

C. Plastic Laminate: Apply plastic laminate finish in full uninterrupted sheets consistent with manufactured sizes. Fit corners and joints hairline; secure with concealed fasteners. Slightly bevel arises. Locate counter butt joints minimum 2 feet (600 mm) from sink cut-outs.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify adequacy of backing and support framing.

B. Verify location and sizes of utility rough-in associated with work of this section.

3.02 INSTALLATION

A. Install work in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS) requirements for grade indicated.

B. Set and secure custom cabinets in place, assuring that they are rigid, plumb, and level.

C. Use fixture attachments in concealed locations for wall mounted components.

D. Use concealed joint fasteners to align and secure adjoining cabinet units.

E. Secure cabinets to floor using appropriate angles and anchorages.

F. Countersink anchorage devices at exposed locations. Conceal with solid wood plugs of species to match surrounding wood; finish flush with surrounding surfaces.

3.03 ADJUSTING

A. Adjust installed work.

B. Adjust moving or operating parts to function smoothly and correctly.

3.04 CLEANING

A. Clean casework, counters, shelves, hardware, fittings, and fixtures.

END OF SECTION

SECTION 07 2500
WEATHER BARRIERS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Water-resistive barriers.

1.02 RELATED REQUIREMENTS

A. Section 06 1000 - Rough Carpentry: Water-resistive barrier under exterior cladding.

B. Section 07 6200 - Sheet Metal Flashing and Trim: Metal flashings installed in conjunction with weather barriers.

1.03 DEFINITIONS

A. Weather Barriers: Assemblies that form either water-resistive barriers, air barriers, or vapor retarders.

B. Water-Resistive Barrier: A material behind an exterior wall covering that is intended to resist liquid water that has penetrated behind the exterior covering from further intruding into the exterior wall assembly.

1.04 REFERENCE STANDARDS

A. AATCC Test Method 127 - Test Method for Water Resistance: Hydrostatic Pressure; 2018, with Editorial Revision (2019).

B. ASTM D1970/D1970M - Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection; 2021.

C. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2021a.

D. ASTM E96/E96M - Standard Test Methods for Gravimetric Determination of Water Vapor Transmission Rate of Materials; 2021.

E. ASTM E2178 - Standard Test Method for Determining Air Leakage Rate and Calculation of Air Permeance of Building Materials; 2021a.

1.05 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements for submittal procedures.

B. Product Data: Provide data on material characteristics.

PART 2 PRODUCTS

2.01 WATER-RESISTIVE BARRIER MATERIALS

A. Water-Resistive and Air Barrier, Multilayers: Outer layers of nonwoven, spunbonded polypropylene with vapor permeable, watertight polymeric middle layer.
   1. Air Permeance: 0.0011 cfm/sq ft (0.0058 L/(s sq m)), maximum, when tested in accordance with ASTM E2178.
   2. Water Vapor Permeance: 54 perms (3,078 ng/(Pa s sq m)), minimum, when tested in accordance with ASTM E96/E96M using Procedure A - Desiccant Method, at 73.4 degrees F (23 degrees C).
   3. Ultraviolet (UV) and Weathering Resistance: Approved by manufacturer for up to 3 months of weather exposure.
   4. Surface Burning Characteristics: Flame spread index of 25 or less, smoke developed index of 450 or less, Class A when tested in accordance with ASTM E84.
   5. Seam and Perimeter Tape: As recommended by sheet manufacturer.
   6. Products:
      a. SIGA Cover Inc; SIGA-Majvest 200: www.siga.swiss/global_en/#sle.
      b. Substitutions: See Section 01 6000 - Product Requirements.

2.02 ACCESSORIES

A. Sealants, Tapes, and Accessories Used for Sealing Water-Resistive Barrier and Adjacent Substrates: As indicated or complying with water-resistive barrier manufacturer's installation instructions.

B. Flexible Flashing: Self-adhesive sheet flashing complying with ASTM D1970/D1970M, except slip resistance requirement is waived if not installed on a roof.
   1. Width: 4 inches (102 mm).

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that surfaces and conditions comply with requirements of this section.

3.02 PREPARATION

A. Remove projections, protruding fasteners, and loose or foreign matter that might interfere with proper installation.

B. Clean and prime substrate surfaces to receive adhesives and sealants in accordance with manufacturer's installation instructions.

3.03 INSTALLATION

A. Install materials in accordance with manufacturer's installation instructions.

B. Water-Resistive Barriers: Install continuous water-resistive barrier over surfaces indicated, with sheets lapped to shed water but with seams not sealed.

C. Mechanically Fastened Exterior Sheets:
   1. Install sheets shingle-fashion to shed water, with seams aligned horizontal.
   2. Overlap seams as recommended by manufacturer, 6 inches (152 mm), minimum.
   3. Overlap at outside and inside corners as recommended by manufacturer, 12 inches (305 mm), minimum.
   4. Install water-resistive barrier over jamb flashings.
   5. Install head flashings under water-resistive barrier.
   6. At framed openings with frames having nailing flanges, extend sheet into opening and over flanges; at head of opening, seal sheet over flange and flashing.

D. Openings and Penetrations in Exterior Water-Resistive Barriers:
   1. Install flashing over sills, covering entire sill framing member, and extend at least 5 inches (127 mm) onto water-resistive barrier and at least 6 inches (152 mm) up jambs; mechanically fasten stretched edges.
   2. At openings filled with frames having nailing flanges, seal head and jamb flanges using a continuous bead of sealant compressed by flange and cover flanges with sealing tape at least 4 inches (100 mm) wide; do not seal sill flange.
   3. At openings filled with nonflanged frames, seal water-resistive barrier to each side of framing at opening using flashing at least 9 inches (230 mm) wide, and covering entire depth of framing.
   4. At head of openings, install flashing under water-resistive barrier extending at least 2 inches (50 mm) beyond face of jambs; seal water-resistive barrier to flashing.
   5. At interior face of openings, seal gaps between window and door frames and rough framing using appropriate joint sealant over backer rod.
   6. Service and Other Penetrations: Form flashing around penetrating items and seal to surface of water-resistive barrier.

END OF SECTION

SECTION 07 4646
FIBER-CEMENT SIDING

PART 1 GENERAL

1.01 RELATED REQUIREMENTS

A. Section 06 1000 - Rough Carpentry: Siding substrate.

B. Section 06 1000 - Rough Carpentry: Water-resistive barrier under siding.

C. Section 07 2500 - Weather Barriers: Water-resistive barrier under siding.

D. Section 07 9200 - Joint Sealants: Sealing joints between siding and adjacent construction and fixtures.

E. Section 09 9113 - Exterior Painting: Field painting.

1.02 REFERENCE STANDARDS

A. ASTM C1186 - Standard Specification for Flat Fiber-Cement Sheets; 2008 (Reapproved 2016).

1.03 DELIVERY, STORAGE, AND HANDLING

A. Store materials under dry and waterproof cover, well ventilated, and elevated above grade on a flat surface.

PART 2 PRODUCTS

2.01 FIBER-CEMENT SIDING

A. Panel Siding: Vertically oriented panels made of cement and cellulose fiber formed under high pressure with integral surface texture, complying with ASTM C1186, Type A, Grade II; with machined edges, for nail attachment.
   1. Length (Height): 96 inches (2400 mm), nominal.
   2. Width: 48 inches (1220 mm).
   3. Thickness: 5/16 inch (8 mm), nominal.
   4. Finish: Factory applied primer.
   5. Color: To match existing.
   6. Warranty: 50 year limited; transferable.
   7. Products:
      a. James Hardie Building Products, Inc; _____: www.jameshardie.com/#sle.
      b. Substitutions: See Section 01 6000 - Product Requirements.

2.02 ACCESSORIES

A. Trim: Same material and texture as siding.
   1. 3/4" Battens @ 16" OC or aligned to existing battens

B. Fasteners: Galvanized or corrosion resistant; length as required to penetrate, 1-1/4 inches (31.8 mm), minimum.

C. Sealant: Elastomeric, polyurethane or silyl-terminated polyether/polyurethane, and capable of being painted.

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine substrate, clean and repair as required to eliminate conditions that would be detrimental to proper installation.

B. Verify that water-resistant barrier has been installed over substrate completely and correctly

C. Do not begin until unacceptable conditions have been corrected.

D. If substrate preparation is responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.02 PREPARATION

A. Protect surrounding areas and adjacent surfaces during execution of this work.

3.03 INSTALLATION

A. Install in accordance with manufacturer's instructions and recommendations.
   1. Read warranty and comply with terms necessary to maintain warranty coverage.
   2. Use trim details as indicated on drawings.
   3. Touch up field cut edges before installing.
   4. Pre-drill nail holes if necessary to prevent breakage.

B. Over Wood and Wood-Composite Sheathing: Fasten siding through sheathing into studs.

C. Allow space for thermal movement between both ends of siding panels that butt against trim; seal joint between panel and trim with specified sealant.

D. Joints in Vertical Siding: Install Z-flashing in horizontal joints between successive courses of vertical siding.

E. Do not install siding less than 6 inches (152 mm) from ground surface, or closer than 1 inch (25.4 mm) to roofs, patios, porches, and other surfaces where water may collect.

F. After installation, seal joints except lap joints of lap siding; seal around penetrations, and paint exposed cut edges.

G. Finish Painting: See Section 09 9113.

END OF SECTION

SECTION 07 5419
PVC THERMOPLASTIC SINGLE-PLY ROOFING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Mechanically attached PVC thermoplastic roofing membrane.

B. Adhered system with PVC thermoplastic roofing membrane.

C. Deck sheathing.

D. Flashings.

E. Roofing cant strips, stack boots, roofing expansion joints, and walkway pads.

1.02 RELATED REQUIREMENTS

A. Section 06 1000 - Rough Carpentry: Wood nailers and curbs.

B. Section 07 6200 - Sheet Metal Flashing and Trim: Counterflashings, reglets and _____.

1.03 REFERENCE STANDARDS

A. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures; Most Recent Edition Cited by Referring Code or Reference Standard.

B. ASTM C1325 - Standard Specification for Fiber-Mat Reinforced Cementitious Backer Units; 2021.

C. ASTM D4434/D4434M - Standard Specification for Poly(Vinyl Chloride) Sheet Roofing; 2021.

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide manufacturer's written information listed below.

C. Warranty:
   1. Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.
   2. Submit installer's certification that installation complies with all warranty conditions for the waterproof membrane.

D. Manufacturer's Qualification Statement.

E. Installer's Qualification Statement.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum twenty (20) years of documented experience.

B. Installer Qualifications: Company specializing in performing the work of this section:
   1. Approved by membrane manufacturer.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Deliver products in manufacturer's original containers, dry, undamaged, with seals and labels intact.

B. Protect products in weather protected environment, clear of ground and moisture.

1.07 FIELD CONDITIONS

A. Do not apply roofing membrane during unsuitable weather.

B. Do not apply roofing membrane when ambient temperature is below 40 degrees F (5 degrees C) or above ____ degrees F (____ degrees C).

C. Do not apply roofing membrane to damp or frozen deck surface or when precipitation is expected or occurring.

D. Do not expose materials vulnerable to water or sun damage in quantities greater than can be weatherproofed the same day.

1.08 WARRANTY

A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.

B. Material Warranty: Provide membrane manufacturer's warranty agreeing to replace material that shows manufacturing defects within 10 years after installation.

C. System Warranty: Provide manufacturer's system warranty agreeing to repair or replace roofing that leaks or is damaged due to wind or other natural causes.
   1. Warranty Term: 20 years.
   2. For repair and replacement include costs of both material and labor in warranty.

PART 2 PRODUCTS

2.01 MANUFACTURER

A. Carlisle SynTec: www.carlisle-syntec.com/#sle.

B. Substitutions: See Section 01 6000 - Product Requirements.

2.02 ROOFING APPLICATIONS

A. PVC Membrane Roofing: One ply membrane, mechanically fastened, over insulation.

B. Roofing Assembly Performance Requirements and Design Criteria:
   1. Wind Uplift:
      a. Designed to withstand wind uplift forces calculated with ASCE 7.
      b. Design Wind Speed: In accordance with local building code and authorities having jurisdiction (AHJ).

2.03 ROOFING MEMBRANE AND ASSOCIATED MATERIALS

A. Membrane:
   1. Material: Polyvinyl chloride (PVC) complying with ASTM D4434/D4434M.
   2. Reinforcing: Internal fabric.
   3. Thickness: 50 mils (0.050 inch) (1.3 mm), minimum.
   4. Sheet Width: Factory fabricated into largest sheets possible.
   5. Color: White.
   6. Product:
      a. Carlisle SureFlex PVC.

B. Seaming Materials: As recommended by membrane manufacturer.

C. Membrane Fasteners: As recommended and approved by membrane manufacturer.

D. Flexible Flashing Material: Same material as membrane.

2.04 DECK SHEATHING AND COVER BOARDS

A. Coverboard: Cement roof board, complying with ASTM C1325.

2.05 ACCESSORIES

A. Prefabricated Flashing Accessories:
   1. Corners and Seams: Same material as membrane, in manufacturer's standard thicknesses.
   2. Penetrations: Same material as membrane, with manufacturer's standard cut-outs, rigid inserts, clamping rings, and flanges.
   3. Walkway Rolls: Sure-Flex Heat Weldable Walkway Rolls; 80 mils (0.080 inch) (2 mm) thick; gray membrane.
   4. Contour Rib Profile: Manufacturer's standard extruded PVC; 1-1/4 inch (32 mm) tall, 2-1/8 inch (54 mm) wide, 3/8 inch (9.5 mm) profile.

5. Miscellaneous Flashing: Non-reinforced PVC membrane; 80 mils (0.080 inch) (2 mm) thick, in manufacturer's standard lengths and widths.

B. Membrane Adhesive: As recommended by membrane manufacturer.

C. Surface Conditioner for Adhesives: Compatible with membrane and adhesives.

D. Sealants: As recommended by membrane manufacturer.

E. Cleaner: Manufacturer's standard, clear, solvent-based cleaner.

F. Edgings and Terminations: Manufacturer's standard edge and termination accessories.
1. Snap-On Edge System:
2. Anchor Bar Fascia System:
3. Drip Edge: Carlisle Sure-Seal Drip Edge.
4. Coping:
5. PVC Coated Sheet Metal.
6. Termination Bar.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that surfaces and site conditions are ready to receive work.

B. Verify deck is supported and secure.

C. Verify deck is clean and smooth, flat, free of depressions, waves, or projections, properly sloped and suitable for installation of roof system.

D. Verify deck surfaces are dry and free of snow or ice.

E. Verify that roof openings, curbs, and penetrations through roof are solidly set, and cant strips are in place.

3.02 WOOD DECK PREPARATION

A. Verify flatness and tightness of joints of wood decking. Verify that all wood decking edges are fully supported. Fill knot holes with latex filler or completely cover with securely nailed sheet metal.

B. Confirm dry deck by moisture meter with 12 percent moisture maximum.

3.03 INSTALLATION - GENERAL

A. Perform work in accordance with manufacturer's instructions.

B. Do not apply roofing membrane during unsuitable weather.

C. Do not apply roofing membrane when ambient temperature is outside the temperature range recommended by manufacturer.

D. Do not apply roofing membrane to damp or frozen deck surface or when precipitation is expected or occurring.

E. Do not expose materials vulnerable to water or sun damage in quantities greater than can be weatherproofed the same day.

3.04 MEMBRANE APPLICATION

A. Roll out membrane, free from wrinkles or tears. Place sheet into place without stretching.

B. Shingle joints on sloped substrate in direction of drainage.

C. Seam Welding:
1. Seam Welding: Overlap edges and ends and seal seams by heat welding, minimum 2 inches (51 mm).
2. Cover all seams with manufacturer's recommended joint covers.
3. Probe all seams once welds have thoroughly cooled. (Approximately 30 minutes.)
4. Repair all deficient seams within the same day.

5. Seal cut edges of reinforced membrane after seam probe is complete.

D. Mechanical Attachment:
   1. Apply membrane and mechanical attachment devices in accordance with manufacturer's instructions.

E. At intersections with vertical surfaces:
   1. Extend membrane over cant strips and up a minimum of 4 inches (100 mm) onto vertical surfaces.
   2. Fully adhere flexible flashing over membrane and up to nailing strips.

F. Coordinate installation of roof drains and sumps and related flashings.

G. Daily Seal: Install daily seal per manufacturers instructions at the end of each work day. Prevent infiltration of water at incomplete flashings, terminations, and at unfinished membrane edges.

3.05 FIELD QUALITY CONTROL

A. See Section 01 4000 - Quality Requirements, for general requirements for field quality control and inspection.

B. Require site attendance of roofing and insulation material manufacturers daily during installation of the Work.

3.06 CLEANING

A. Remove bituminous markings from finished surfaces.

B. In areas where finished surfaces are soiled by work of this section, consult manufacturer of surfaces for cleaning advice and conform to their documented instructions.

C. Repair or replace defaced or damaged finishes caused by work of this section.

3.07 PROTECTION

A. Protect installed roofing and flashings from construction operations.

B. Where traffic must continue over finished roof membrane, protect surfaces using durable materials.

END OF SECTION

SECTION 07 6200
SHEET METAL FLASHING AND TRIM

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Fabricated sheet metal items, including flashings, counterflashings, gutters, downspouts, sheet metal roofing, exterior penetrations, and other items indicated in Schedule.

B. Sealants for joints within sheet metal fabrications.

1.02 RELATED REQUIREMENTS

A. Section 06 1000 - Rough Carpentry: Wood blocking for batten seams.

B. Section 06 1000 - Rough Carpentry: Field fabricated roof curbs.

C. Section 07 7200 - Roof Accessories: Manufactured metal roof curbs.

D. Section 07 9200 - Joint Sealants: Sealing non-lap joints between sheet metal fabrications and adjacent construction.

1.03 REFERENCE STANDARDS

A. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2020.

B. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2020.

C. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2018.

D. ASTM D226/D226M - Standard Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing; 2017.

E. ASTM D4586/D4586M - Standard Specification for Asphalt Roof Cement, Asbestos-Free; 2007 (Reapproved 2018).

F. CDA A4050 - Copper in Architecture - Handbook; current edition.

G. SMACNA (ASMM) - Architectural Sheet Metal Manual; 2012.

1.04 QUALITY ASSURANCE

A. Perform work in accordance with SMACNA (ASMM) and CDA A4050 requirements and standard details, except as otherwise indicated.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Stack material to prevent twisting, bending, and abrasion, and to provide ventilation. Slope metal sheets to ensure drainage.

B. Prevent contact with materials that could cause discoloration or staining.

PART 2 PRODUCTS

2.01 SHEET MATERIALS

A. Pre-Finished Galvanized Steel: ASTM A653/A653M, with G90/Z275 zinc coating; minimum 24-gauge, 0.0239-inch (0.61 mm) thick base metal, shop pre-coated with PVDF coating.
   1. Polyvinylidene Fluoride (PVDF) Coating: Superior performing organic powder coating, AAMA 2605; multiple coat, thermally cured fluoropolymer finish system.

2.02 FABRICATION

A. Form sections true to shape, accurate in size, square, and free from distortion or defects.

B. Form pieces in longest possible lengths.

C. Hem exposed edges on underside 1/2 inch (13 mm); miter and seam corners.

D. Form material with flat lock seams, except where otherwise indicated; at moving joints, use sealed lapped, bayonet-type or interlocking hooked seams.

E. Fabricate corners from one piece with minimum 18-inch (450 mm) long legs; seam for rigidity, seal with sealant.

2.03 EXTERIOR PENETRATION FLASHING PANELS

A. Flashing Panels for Exterior Wall Penetrations: Premanufactured components and accessories as required to preserve integrity of building envelope; suitable for conduits and facade materials to be installed.

2.04 ACCESSORIES

A. Fasteners: Galvanized steel, with soft neoprene washers.

B. Underlayment: ASTM D226/D226M, organic roofing felt, Type I, No. 15.

C. Primer: Zinc chromate type.

D. Protective Backing Paint: Zinc molybdate alkyd.

E. Concealed Sealants: Non-curing butyl sealant.

F. Exposed Sealants: ASTM C920; elastomeric sealant, with minimum movement capability as recommended by manufacturer for substrates to be sealed; color to match adjacent material.

G. Asphalt Roof Cement: ASTM D4586/D4586M, Type I, asbestos-free.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify roof openings, curbs, pipes, sleeves, ducts, and vents through roof are solidly set, reglets in place, and nailing strips located.

B. Verify roofing termination and base flashings are in place, sealed, and secure.

3.02 PREPARATION

A. Install starter and edge strips, and cleats before starting installation.

3.03 INSTALLATION

A. Secure flashings in place using concealed fasteners, and use exposed fasteners only where permitted..

B. Apply plastic cement compound between metal flashings and felt flashings.

C. Fit flashings tight in place; make corners square, surfaces true and straight in planes, and lines accurate to profiles.

D. Seal metal joints watertight.

3.04 FIELD QUALITY CONTROL

A. See Section 01 4000 - Quality Requirements for field inspection requirements.

B. Inspection will involve surveillance of work during installation to ascertain compliance with specified requirements.

END OF SECTION

SECTION 07 9200
JOINT SEALANTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Nonsag gunnable joint sealants.

B. Joint backings and accessories.

1.02 RELATED REQUIREMENTS

A. Section 01 6116 - Volatile Organic Compound (VOC) Content Restrictions: Additional requirements for sealants and primers.

B. Section 07 1300 - Sheet Waterproofing: Sealing cracks and joints in waterproofing substrate surfaces using materials specified in this section.

C. Section 07 2500 - Weather Barriers: Sealants required in conjunction with water-resistive barriers.

D. Section 07 9100 - Preformed Joint Seals: Precompressed foam, gaskets, and strip seals.

1.03 REFERENCE STANDARDS

A. ASTM C661 - Standard Test Method for Indentation Hardness of Elastomeric-Type Sealants by Means of a Durometer; 2015 (Reapproved 2022).

B. ASTM C834 - Standard Specification for Latex Sealants; 2017.

C. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2018.

D. ASTM C1193 - Standard Guide for Use of Joint Sealants; 2016.

E. ASTM C1248 - Standard Test Method for Staining of Porous Substrate by Joint Sealants; 2018.

F. ASTM C1311 - Standard Specification for Solvent Release Sealants; 2014.

G. ASTM C1330 - Standard Specification for Cylindrical Sealant Backing for Use with Cold Liquid-Applied Sealants; 2018.

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements for submittal procedures.

B. Product Data for Sealants: Submit manufacturer's technical data sheets for each product to be used, that includes the following.
   1. Physical characteristics, including movement capability, VOC content, hardness, cure time, and color availability.
   2. List of backing materials approved for use with the specific product.
   3. Substrates that product is known to satisfactorily adhere to and with which it is compatible.
   4. Substrates the product should not be used on.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Non-Sag Sealants: Permits application in joints on vertical surfaces without sagging or slumping.
   1. Dow: www.dow.com/#sle.
   2. Substitutions: See Section 01 6000 - Product Requirements.

B. Self-Leveling Sealants: Pourable or self-leveling sealant that has sufficient flow to form a smooth, level surface when applied in a horizontal joint.
   1. Dow: www.dow.com/#sle.
   2. Substitutions: See Section 01 6000 - Product Requirements.

2.02 JOINT SEALANT APPLICATIONS

A. Scope:

1. Exterior Joints: Seal open joints, whether or not the joint is indicated on drawings, unless specifically indicated not to be sealed. Exterior joints to be sealed include, but are not limited to, the following items.
   a. Wall expansion and control joints.
   b. Joints between door, window, and other frames and adjacent construction.
   c. Joints between different exposed materials.
   d. Openings below ledge angles in masonry.
   e. Other joints indicated below.
2. Interior Joints: Do not seal interior joints unless specifically indicated to be sealed. Interior joints to be sealed include, but are not limited to, the following items.
   a. Joints between door, window, and other frames and adjacent construction.
   b. Other joints indicated below.

B. Exterior Joints: Use non-sag non-staining silicone sealant, unless otherwise indicated.
   1. Lap Joints in Sheet Metal Fabrications: Butyl rubber, non-curing.

C. Interior Joints: Use non-sag polyurethane sealant, unless otherwise indicated.
   1. Wall and Ceiling Joints in Non-Wet Areas: Acrylic emulsion latex sealant.
   2. Wall and Ceiling Joints in Wet Areas: Non-sag polyurethane sealant for continuous liquid immersion.
   3. Floor Joints in Wet Areas: Non-sag polyurethane "non-traffic-grade" sealant suitable for continuous liquid immersion.
   4. Joints between Fixtures in Wet Areas and Floors, Walls, and Ceilings: Mildew-resistant silicone sealant; white.

D. Interior Wet Areas: Bathrooms, restrooms, kitchens, food service areas, and food processing areas; fixtures in wet areas include plumbing fixtures, food service equipment, countertops, cabinets, and other similar items.

2.03 JOINT SEALANTS - GENERAL

A. Colors: To match adjacent surfaces where not to be painted. Where painted, use paintable grade sealants.

2.04 NONSAG JOINT SEALANTS

A. Non-Staining Silicone Sealant: ASTM C920, Grade NS, Uses M and A; not expected to withstand continuous water immersion or traffic.
   1. Movement Capability: Plus and minus 25 percent, minimum.
   2. Non-Staining to Porous Stone: Non-staining to light-colored natural stone when tested in accordance with ASTM C1248.
   3. Dirt Pick-Up: Reduced dirt pick-up compared to other silicone sealants.
   4. Hardness Range: 15 to 35, Shore A, when tested in accordance with ASTM C661.
   5. Color: Match adjacent finished surfaces.

B. Mildew-Resistant Silicone Sealant: ASTM C920, Grade NS, Uses M and A; single component, mildew resistant; not expected to withstand continuous water immersion or traffic.
   1. Color: White.

C. Polyurethane Sealant: ASTM C920, Grade NS, Uses M and A; single or multi-component; not expected to withstand continuous water immersion or traffic.
   1. Movement Capability: Plus and minus 25 percent, minimum.
   2. Hardness Range: 20 to 35, Shore A, when tested in accordance with ASTM C661.
   3. Color: Match adjacent finished surfaces.

D. Type ___ - Polyurethane Sealant for Continuous Water Immersion: ASTM C920, Grade NS, Uses M and A; single or multi-component; explicitly approved by manufacturer for continuous water immersion; suitable for traffic exposure when recessed below traffic surface.
   1. Movement Capability: Plus and minus 35 percent, minimum.

E. Non-Sag "Traffic-Grade" Polyurethane Sealant: ASTM C920, Grade NS, Uses M and A; single or multi-component; explicitly approved by manufacturer for continuous water immersion and traffic without the necessity to recess sealant below traffic surface.
   1. Movement Capability: Plus and minus 25 percent, minimum.
   2. Hardness Range: 40 to 50, Shore A, when tested in accordance with ASTM C661.
   3. Color: Match adjacent finished surfaces.

F. Acrylic Emulsion Latex: Water-based; ASTM C834, single component, non-staining, non-bleeding, non-sagging; not intended for exterior use.
   1. Color: Standard colors matching finished surfaces, Type OP (opaque).
   2. Grade: ASTM C834; Grade 0 Degrees F (Minus 18 Degrees C).

G. Non-Curing Butyl Sealant: Solvent-based, single component, non-sag, non-skinning, non-hardening, non-bleeding; non-vapor-permeable; intended for fully concealed applications.

2.05 ACCESSORIES

A. Backer Rod: Cylindrical cellular foam rod with surface that sealant will not adhere to, compatible with specific sealant used, and recommended by backing and sealant manufacturers for specific application.
   1. Type for Joints Not Subject to Pedestrian or Vehicular Traffic: ASTM C1330; Type O - Open Cell Polyurethane.
   2. Type for Joints Subject to Pedestrian or Vehicular Traffic: ASTM C1330; Type B - Bi-Cellular Polyethylene.
   3. Open Cell: 40 to 50 percent larger in diameter than joint width.
   4. Closed Cell and Bi-Cellular: 25 to 33 percent larger in diameter than joint width.

B. Backing Tape: Self-adhesive polyethylene tape with surface that sealant will not adhere to and recommended by tape and sealant manufacturers for specific application.

C. Masking Tape: Self-adhesive, nonabsorbent, non-staining, removable without adhesive residue, and compatible with surfaces adjacent to joints and sealants.

D. Joint Cleaner: Non-corrosive and non-staining type, type recommended by sealant manufacturer; compatible with joint forming materials.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that joints are ready to receive work.

B. Verify that backing materials are compatible with sealants.

C. Verify that backer rods are of the correct size.

3.02 PREPARATION

A. Remove loose materials and foreign matter that could impair adhesion of sealant.

B. Clean joints, and prime as necessary, in accordance with manufacturer's instructions.

C. Perform preparation in accordance with manufacturer's instructions and ASTM C1193.

D. Mask elements and surfaces adjacent to joints from damage and disfigurement due to sealant work; be aware that sealant drips and smears may not be completely removable.

3.03 INSTALLATION

A. Perform work in accordance with sealant manufacturer's requirements for preparation of surfaces and material installation instructions.

B. Perform installation in accordance with ASTM C1193.

C. Measure joint dimensions and size joint backers to achieve width-to-depth ratio, neck dimension, and surface bond area as recommended by manufacturer, except where specific dimensions are indicated.

D. Install bond breaker backing tape where backer rod cannot be used.

E. Install sealant free of air pockets, foreign embedded matter, ridges, and sags, and without getting sealant on adjacent surfaces.

F. Do not install sealant when ambient temperature is outside manufacturer's recommended temperature range, or will be outside that range during the entire curing period, unless manufacturer's approval is obtained and instructions are followed.

G. Nonsag Sealants: Tool surface concave, unless otherwise indicated; remove masking tape immediately after tooling sealant surface.

END OF SECTION

SECTION 08 3313
COILING COUNTER DOORS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Non-fire-rated coiling counter doors and operating hardware.

1.02 RELATED REQUIREMENTS

A. Section 06 1000 - Rough Carpentry: Rough openings.

B. Section 07 9200 - Joint Sealants: Sealing joints between frames and adjacent construction.

C. Section 09 2116 - Gypsum Board Assemblies: Rough openings.

1.03 REFERENCE STANDARDS

A. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2015.

B. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2021.

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Submit manufacturer's standard literature showing materials and details of construction and finish. Include data on electrical operation.

C. Shop Drawings: Indicate rough and actual opening dimensions, anchorage methods, hardware locations, and installation details.

D. Manufacturer's Instructions: Indicate installation sequence and installation, adjustment, and alignment procedures.

E. Operation and Maintenance Data: Indicate modes of operation, lubrication requirements and frequency, and periodic adjustments required.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Coiling Counter Doors:
   1. Overhead Door; Counter Doors 652: www.overheaddoor.com.
   2. Substitutions: See Section 01 6000 - Product Requirements.

2.02 COILING COUNTER DOORS

A. Coiling Counter Doors, Non-Fire-Rated: Aluminum slat curtain.
   1. Mounting: Between jambs, within prepared opening.
   2. Nominal Slat Size: 1-1/4 inches (32 mm) wide.
   3. Slat Profile: Flat, perforated.
   4. Finish, Aluminum: Anodized.
   5. Guides: Formed track; same material and finish unless otherwise indicated.
   6. Hood Enclosure: Manufacturer's standard; primed steel.
   7. Manual push up operation.

2.03 MATERIALS

A. Curtain Construction: Interlocking, single thickness slats.
   1. Slat Ends: Alternate slats fitted with end locks to act as wearing surface in guides and to prevent lateral movement.
   2. Curtain Bottom: Fitted with angles to provide reinforcement and positive contact in closed position.

3. Aluminum Slats: ASTM B221 (ASTM B221M), aluminum alloy Type 6063; minimum thickness 0.05 inch (1.3 mm).

B. Guide Construction: Continuous, of profile to retain door in place, with mounting brackets of same metal.
   1. Aluminum Guides: Extruded aluminum channel, with wool pile runners along inside.

C. Hood Enclosure: Internally reinforced to maintain rigidity and shape.

D. Lock Hardware:

E. Roller Shaft Counterbalance: Steel pipe and torsion steel spring system, capable of producing torque sufficient to ensure smooth operation of curtain from any position and capable of holding position at mid-travel; with adjustable spring tension; requiring 25 lb (10 kg) nominal force to operate.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that opening sizes, tolerances and conditions are acceptable.

3.02 INSTALLATION

A. Install units in accordance with manufacturer's instructions.

B. Use anchorage devices to securely fasten assembly to wall construction and building framing without distortion or stress.

C. Securely and rigidly brace components suspended from structure. Secure guides to structural members only.

D. Fit and align assembly including hardware; level and plumb, to provide smooth operation.

3.03 ADJUSTING

A. Adjust operating assemblies for smooth and noiseless operation.

3.04 CLEANING

A. Clean installed components.

B. Remove labels and visible markings.

END OF SECTION

SECTION 09 0561
COMMON WORK RESULTS FOR FLOORING PREPARATION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. This section applies to floors identified in Contract Documents that are receiving the following types of floor coverings:
   1. Resilient tile and sheet.

B. Removal of existing floor coverings.

C. Preparation of new and existing concrete floor slabs for installation of floor coverings.

D. Testing of concrete floor slabs for moisture and alkalinity (pH).

E. Patching compound.

F. Remedial floor coatings.

1.02 RELATED REQUIREMENTS

A. Section 03 3000 - Cast-in-Place Concrete: Moisture emission reducing curing and sealing compound for slabs to receive adhered flooring, to prevent moisture content-related flooring failures; to remain in place, not to be removed.

1.03 REFERENCE STANDARDS

A. ASTM C109/C109M - Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2-in. or [50 mm] Cube Specimens); 2021.

B. ASTM C472 - Standard Test Methods for Physical Testing of Gypsum, Gypsum Plasters and Gypsum Concrete; 2020.

C. ASTM F1869 - Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride; 2016a.

D. RFCI (RWP) - Recommended Work Practices for Removal of Resilient Floor Coverings; 2011.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordinate scheduling of cleaning and testing, so that preliminary cleaning has been completed for at least 24 hours prior to testing.

1.05 QUALITY ASSURANCE

A. Contractor may perform adhesive and bond test with Contractor's own personnel or hire a testing agency.

PART 2 PRODUCTS

2.01 MATERIALS

A. Patching Compound: Floor covering manufacturer's recommended product, suitable for conditions, and compatible with adhesive and floor covering. In the absence of any recommendation from flooring manufacturer, provide a product with the following characteristics:
   1. Cementitious moisture-, mildew-, and alkali-resistant compound, compatible with floor, floor covering, and floor covering adhesive, and capable of being feathered to nothing at edges.
   2. Latex or polyvinyl acetate additions are permitted; gypsum content is prohibited.
   3. Compressive Strength: 3000 psi, minimum, after 28 days, when tested in accordance with ASTM C109/C109M or ASTM C472, whichever is appropriate.

B. Alternate Flooring Adhesive: Floor covering manufacturer's recommended product, suitable for the moisture and pH conditions present; low-VOC. In the absence of any recommendation

from flooring manufacturer, provide a product recommended by adhesive manufacturer as suitable for substrate and floor covering and for conditions present.

PART 3 EXECUTION

3.01 CONCRETE SLAB PREPARATION

A. Perform following operations in the order indicated:
   1. Existing concrete slabs (on-grade and elevated) with existing floor coverings:
      a. Visual observation of existing floor covering, for adhesion, water damage, alkaline deposits, and other defects.
      b. Removal of existing floor covering.
   2. Preliminary cleaning.
   3. Moisture vapor emission tests; 3 tests in the first 1000 square feet (100 square meters) and one test in each additional 1000 square feet (100 square meters), unless otherwise indicated or required by flooring manufacturer.
   4. Internal relative humidity tests; in same locations as moisture vapor emission tests, unless otherwise indicated.
   5. Alkalinity (pH) tests; in same locations as moisture vapor emission tests, unless otherwise indicated.
   6. Specified remediation, if required.
   7. Patching, smoothing, and leveling, as required.
   8. Other preparation specified.
   9. Adhesive bond and compatibility test.
   10. Protection.

3.02 REMOVAL OF EXISTING FLOOR COVERINGS

A. Comply with local, State, and federal regulations and recommendations of RFCI Recommended Work Practices for Removal of Resilient Floor Coverings, as applicable to floor covering being removed.

B. Dispose of removed materials in accordance with local, State, and federal regulations and as specified.

3.03 PRELIMINARY CLEANING

A. Clean floors of dust, solvents, paint, wax, oil, grease, asphalt, residual adhesive, adhesive removers, film-forming curing compounds, sealing compounds, alkaline salts, excessive laitance, mold, mildew, and other materials that might prevent adhesive bond.

B. Do not use solvents or other chemicals for cleaning.

3.04 MOISTURE VAPOR EMISSION TESTING

A. Where the floor covering manufacturer's requirements conflict with either the referenced test method or this specification, comply with the manufacturer's requirements.

B. Where this specification conflicts with the referenced test method, comply with the requirements of this section.

C. Test in accordance with ASTM F1869 and as follows.

D. Plastic sheet test and mat bond test may not be substituted for the specified ASTM test method, as those methods do not quantify the moisture content sufficiently.

E. In the event that test values exceed floor covering manufacturer's limits, perform remediation as indicated. In the absence of manufacturer limits, perform remediation if test values exceed 3 pounds per 1000 square feet (1.4 kg per 93 square meters) per 24 hours.

F. Report: Report the information required by the test method.

3.05 ALKALINITY TESTING

A. Where the floor covering manufacturer's requirements conflict with either the referenced test method or this specification, comply with the manufacturer's requirements.

B. In the event that test values exceed floor covering manufacturer's limits, perform remediation as indicated. In the absence of manufacturer limits, perform remediation if alkalinity (pH) test value is over 10.

3.06 PREPARATION

A. See individual floor covering section(s) for additional requirements.

B. Comply with requirements and recommendations of floor covering manufacturer.

C. Fill and smooth surface cracks, grooves, depressions, control joints and other non-moving joints, and other irregularities with patching compound.

D. Do not fill expansion joints, isolation joints, or other moving joints.

3.07 ADHESIVE BOND AND COMPATIBILITY TESTING

A. Comply with requirements and recommendations of floor covering manufacturer.

END OF SECTION

SECTION 09 2116
GYPSUM BOARD ASSEMBLIES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Wood stud wall framing.

B. Gypsum wallboard.

C. Joint treatment and accessories.

1.02 RELATED REQUIREMENTS

A. Section 06 1000 - Rough Carpentry: Building framing.

B. Section 06 1000 - Rough Carpentry: Wood blocking product and execution requirements.

1.03 REFERENCE STANDARDS

A. ASTM C475/C475M - Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board; 2017.

B. ASTM C840 - Standard Specification for Application and Finishing of Gypsum Board; 2020.

C. ASTM C1002 - Standard Specification for Steel Self-Piercing Tapping Screws for Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs; 2020.

D. ASTM C1047 - Standard Specification for Accessories for Gypsum Wallboard and Gypsum Veneer Base; 2019.

E. ASTM C1396/C1396M - Standard Specification for Gypsum Board; 2017.

F. ASTM C1629/C1629M - Standard Classification for Abuse-Resistant Nondecorated Interior Gypsum Panel Products and Fiber-Reinforced Cement Panels; 2019.

G. ASTM D3273 - Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber; 2016.

H. GA-216 - Application and Finishing of Gypsum Panel Products; 2016, with Errata.

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements for submittal procedures.

B. Product Data: Provide data on metal framing, gypsum board, accessories, and joint finishing system.

PART 2 PRODUCTS

2.01 BOARD MATERIALS

A. Manufacturers - Gypsum-Based Board:
   1. American Gypsum Company: www.americangypsum.com/#sle.
   2. CertainTeed Corporation: www.certainteed.com/#sle.
   3. Georgia-Pacific Gypsum: www.gpgypsum.com/#sle.
   4. USG Corporation: www.usg.com/#sle.

B. Abuse Resistant Wallboard:
   1. Application: High-traffic areas indicated.
   2. Surface Abrasion: Level 2, minimum, when tested in accordance with ASTM C1629/C1629M.
   3. Indentation: Level 1, minimum, when tested in accordance with ASTM C1629/C1629M.
   4. Soft Body Impact: Level 1, minimum, when tested in accordance with ASTM C1629/C1629M.
   5. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
   6. Paper-Faced Type: Gypsum wallboard, as defined in ASTM C1396/C1396M.
   7. Thickness: 5/8 inch (16 mm).

8. Edges: Tapered.

2.02 GYPSUM BOARD ACCESSORIES

A. Beads, Joint Accessories, and Other Trim: ASTM C1047, rigid plastic, galvanized steel, or rolled zinc, unless noted otherwise.
   1. Corner Beads: Low profile, for 90 degree outside corners.

B. Joint Materials: ASTM C475/C475M and as recommended by gypsum board manufacturer for project conditions.
   1. Fiberglass Tape: 2 inch (50 mm) wide, coated glass fiber tape for joints and corners, except as otherwise indicated.
   2. Joint Compound: Drying type, vinyl-based, ready-mixed.
   3. Joint Compound: Setting type, field-mixed.

C. High Build Drywall Surfacer: Vinyl acrylic latex-based coating for spray application, designed to take the place of skim coating and separate paint primer in achieving Level 5 finish.

D. Screws for Fastening of Gypsum Panel Products to Cold-Formed Steel Studs Less than 0.033 inches (0.84 mm) in Thickness and Wood Members: ASTM C1002; self-piercing tapping screws, corrosion-resistant.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that project conditions are appropriate for work of this section to commence.

3.02 FRAMING INSTALLATION

A. Studs: Space studs at 16 inches on center (at 406 mm on center).
   1. Extend partition framing to structure where indicated and to ceiling in other locations.
   2. Partitions Terminating at Ceiling: Attach ceiling runner securely to ceiling track in accordance with manufacturer's instructions.

B. Blocking: Install wood blocking for support of:
   1. Wall-mounted cabinets.
   2. Plumbing fixtures.

3.03 BOARD INSTALLATION

A. Comply with ASTM C840, GA-216, and manufacturer's instructions. Install to minimize butt end joints, especially in highly visible locations.

B. Single-Layer Nonrated: Install gypsum board in most economical direction, with ends and edges occurring over firm bearing.
   1. Exception: Tapered edges to receive joint treatment at right angles to framing.

C. Exposed Gypsum Board in Interior Wet Areas: Seal joints, cut edges, and holes with water-resistant sealant.

D. Installation on Wood Framing: For rated assemblies, comply with requirements of listing authority. For nonrated assemblies, install as follows:
   1. Single-Layer Applications: Screw attachment.

3.04 INSTALLATION OF TRIM AND ACCESSORIES

A. Control Joints: Place control joints consistent with lines of building spaces and as indicated.

B. Corner Beads: Install at external corners, using longest practical lengths.

C. Edge Trim: Install at locations where gypsum board abuts dissimilar materials.

3.05 JOINT TREATMENT

A. Finish gypsum board in accordance with levels defined in ASTM C840, as follows:
   1. Level 5: Walls and ceilings to receive semi-gloss or gloss paint finish and other areas specifically indicated.

B. Tape, fill, and sand exposed joints, edges, and corners to produce smooth surface ready to receive finishes.
   1. Feather coats of joint compound so that camber is maximum 1/32 inch (0.8 mm).

C. Where Level 5 finish is indicated, spray apply high build drywall surfacer over entire surface after joints have been properly treated; achieve a flat and tool mark-free finish.

3.06 TOLERANCES

A. Maximum Variation of Finished Gypsum Board Surface from True Flatness: 1/8 inch in 10 feet (3 mm in 3 m) in any direction.

END OF SECTION

SECTION 09 6500
RESILIENT FLOORING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Resilient tile flooring.

B. Resilient base.

C. Installation accessories.

1.02 RELATED REQUIREMENTS

A. Section 03 3000 - Cast-in-Place Concrete: Restrictions on curing compounds for concrete slabs and floors to receive adhesive-applied resilient flooring.

B. Section 09 0561 - Common Work Results for Flooring Preparation: Removal of existing floor coverings, cleaning, and preparation.

C. Section 09 0561 - Common Work Results for Flooring Preparation: Concrete slab moisture and alkalinity testing and remediation procedures.

D. Section 26 0526 - Grounding and Bonding for Electrical Systems: Grounding and bonding of static control flooring to building grounding system.

1.03 REFERENCE STANDARDS

A. ASTM E648 - Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source; 2019a, with Editorial Revision (2020).

B. ASTM F970 - Standard Test Method for Measuring Recovery Properties of Floor Coverings after Static Loading; 2017.

C. ASTM F1066 - Standard Specification for Vinyl Composition Floor Tile; 2004 (Reapproved 2018).

D. ASTM F1303 - Standard Specification for Sheet Vinyl Floor Covering with Backing; 2004 (Reapproved 2021).

E. ASTM F1700 - Standard Specification for Solid Vinyl Floor Tile; 2020.

F. ASTM F1861 - Standard Specification for Resilient Wall Base; 2021.

G. RFCI (RWP) - Recommended Work Practices for Removal of Resilient Floor Coverings; 2011.

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements for submittal procedures.

B. Product Data: Provide data on specified products, describing physical and performance characteristics; including sizes, patterns and colors available; and installation instructions.

C. Maintenance Data: Include maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning, stripping, and re-waxing.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing specified flooring with minimum three years documented experience.

B. Installer Qualifications: Company specializing in installing specified flooring with minimum three years documented experience.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Upon receipt, immediately remove any shrink-wrap and check materials for damage and the correct style, color, quantity and run numbers.

B. Store all materials off of the floor in an acclimatized, weather-tight space.

C. Maintain temperature in storage area between 55 degrees F (13 degrees C) and 90 degrees F (72 degrees C).

D. Protect roll materials from damage by storing on end.

1.07 FIELD CONDITIONS

A. Store materials for not less than 48 hours prior to installation in area of installation at a temperature of 70 degrees F (21 degrees C) to achieve temperature stability. Thereafter, maintain conditions above 55 degrees F (13 degrees C).

PART 2 PRODUCTS

2.01 TILE FLOORING

A. Vinyl Composition Tile: Homogeneous, with color extending throughout thickness.
   1. Manufacturers:
      a. Armstrong Flooring, Inc; Standard Execelon Imperial Texture: www.armstrongflooring.com/#sle.
      b. Substitutions: See Section 01 6000 - Product Requirements.
   2. Minimum Requirements: Comply with ASTM F1066, of Class corresponding to type specified.
   3. Size: 12 by 12 inch (305 by 305 mm).
   4. Thickness: 0.125 inch (3.2 mm).
   5. Pattern: Running bond.
   6. Color: Charcoal.

2.02 RESILIENT BASE

A. Resilient Base - Type ____: ASTM F1861, Type TS rubber, vulcanized thermoset; style as scheduled.
   1. Height: 4 inch (100 mm).
   2. Thickness: 0.125 inch (3.2 mm).
   3. Finish: Satin.
   4. Accessories: Premolded external corners and internal corners.

2.03 ACCESSORIES

A. Subfloor Filler: White premix latex; type recommended by adhesive material manufacturer.

B. Primers, Adhesives, and Seam Sealer: Waterproof; types recommended by flooring manufacturer.

C. Adhesive for Vinyl Flooring:

D. Moldings, Transition and Edge Strips: Same material as flooring.

E. Sealer and Wax: Types recommended by flooring manufacturer.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that surfaces are flat to tolerances acceptable to flooring manufacturer, free of cracks that might telegraph through flooring, clean, dry, and free of curing compounds, surface hardeners, and other chemicals that might interfere with bonding of flooring to substrate.

B. Cementitious Subfloor Surfaces: Verify that substrates are ready for resilient flooring installation by testing for moisture and alkalinity (pH).
   1. Obtain instructions if test results are not within limits recommended by resilient flooring manufacturer and adhesive materials manufacturer.

3.02 PREPARATION

A. Remove existing resilient flooring and flooring adhesives; follow the recommendations of RFCI (RWP).

B. Prepare floor substrates as recommended by flooring and adhesive manufacturers.

C. Remove subfloor ridges and bumps. Fill minor low spots, cracks, joints, holes, and other defects with subfloor filler to achieve smooth, flat, hard surface.

D. Prohibit traffic until filler is fully cured.

E. Clean substrate.

3.03 INSTALLATION - GENERAL

A. Starting installation constitutes acceptance of subfloor conditions.

B. Install in accordance with manufacturer's written instructions.

C. Adhesive-Applied Installation:
   1. Place copper grounding strip in conductive adhesive and apply additional adhesive to top side of strip before installing static control flooring. Allow strip to extend beyond flooring in accordance with static control flooring manufacturer's instructions. Refer to Section 26 0526 for grounding and bonding to building grounding system.
   2. Fit joints and butt seams tightly.
   3. Set flooring in place, press with heavy roller to attain full adhesion.

D. Where type of floor finish, pattern, or color are different on opposite sides of door, terminate flooring under centerline of door.

E. Scribe flooring to walls, columns, cabinets, floor outlets, and other appurtenances to produce tight joints.

3.04 INSTALLATION - TILE FLOORING

A. Mix tile from container to ensure shade variations are consistent when tile is placed, unless otherwise indicated in manufacturer's installation instructions.

B. Lay flooring with joints and seams parallel to building lines to produce symmetrical pattern.

3.05 INSTALLATION - RESILIENT BASE

A. Fit joints tightly and make vertical. Maintain minimum dimension of 18 inches (45 mm) between joints.

B. Miter internal corners. At external corners, use premolded units. At exposed ends, use premolded units.

C. Install base on solid backing. Bond tightly to wall and floor surfaces.

D. Scribe and fit to door frames and other interruptions.

3.06 CLEANING

A. Remove excess adhesive from floor, base, and wall surfaces without damage.

B. Clean in accordance with manufacturer's written instructions.

3.07 PROTECTION

A. Prohibit traffic on resilient flooring for 48 hours after installation.

END OF SECTION

SECTION 09 9113
EXTERIOR PAINTING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Surface preparation.

B. Field application of paints.

C. Scope: Finish exterior surfaces exposed to view, unless fully factory-finished and unless otherwise indicated, including the following:

D. Do Not Paint or Finish the Following Items:
   1. Items factory-finished unless otherwise indicated; materials and products having factory-applied primers are not considered factory finished.
   2. Items indicated to receive other finishes.
   3. Items indicated to remain unfinished.
   4. Fire rating labels, equipment serial number and capacity labels, and operating parts of equipment.
   5. Floors, unless specifically indicated.
   6. Glass.
   7. Concealed pipes, ducts, and conduits.

1.02 RELATED REQUIREMENTS

A. Section 09 9123 - Interior Painting.

B. Section 09 9600 - High-Performance Coatings.

1.03 REFERENCE STANDARDS

A. ASTM D4442 - Standard Test Methods for Direct Moisture Content Measurement of Wood and Wood-Based Materials; 2020.

B. MPI (APSM) - Master Painters Institute Architectural Painting Specification Manual; Current Edition.

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide complete list of products to be used, with the following information for each:
   1. Manufacturer's name, product name and/or catalog number, and general product category (e.g. "alkyd enamel").
   2. MPI product number (e.g. MPI #47).
   3. Cross-reference to specified paint system(s) product is to be used in; include description of each system.
   4. Manufacturer's installation instructions.
   5. If proposal of substitutions is allowed under submittal procedures, explanation of substitutions proposed.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified, with minimum three years documented experience.

B. Applicator Qualifications: Company specializing in performing the type of work specified with minimum 5 years experience and approved by manufacturer.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.

B. Container Label: Include manufacturer's name, type of paint, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.

C. Paint Materials: Store at minimum ambient temperature of 45 degrees F (7 degrees C) and a maximum of 90 degrees F (32 degrees C), in ventilated area, and as required by manufacturer's instructions.

1.07 FIELD CONDITIONS

A. Do not apply materials when surface and ambient temperatures are outside the paint product manufacturer's temperature ranges.

B. Follow manufacturer's recommended procedures for producing best results, including testing of substrates, moisture in substrates, and humidity and temperature limitations.

C. Do not apply exterior paint and finishes during rain or snow, or when relative humidity is outside the humidity ranges required by the paint product manufacturer.

D. Minimum Application Temperatures for Latex Paints: 50 degrees F (10 degrees C) for exterior; unless required otherwise by manufacturer's instructions.

E. Provide lighting level of 80 ft candles (860 lx) measured mid-height at substrate surface.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Provide paints and finishes used in any individual system from the same manufacturer; no exceptions.

B. Paints:
1. Base Manufacturer: Sherwin-Williams Company: www.sherwin-williams.com.
2. Behr Process Corporation; _____: www.behr.com/#sle.
3. Miller Paint Company: www.millerpaint.com

C. Primer Sealers: Same manufacturer as top coats.

D. Substitutions: See Section 01 6000 - Product Requirements.

2.02 PAINTS AND FINISHES - GENERAL

A. Paints and Finishes: Ready-mixed, unless required to be a field-catalyzed paint.
1. Provide paints and finishes of a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating, with good flow and brushing properties, and capable of drying or curing free of streaks or sags.
2. Supply each paint material in quantity required to complete entire project's work from a single production run.
3. Do not reduce, thin, or dilute paint or finishes or add materials unless such procedure is described explicitly in manufacturer's product instructions.

B. Sheens: Satin

C. Colors: As indicated on drawings.

2.03 PAINT SYSTEMS - EXTERIOR

A. Paint E-OP - Exterior Surfaces to be Painted, Unless Otherwise Indicated: Including concrete, concrete masonry units, brick, fiber cement siding, primed wood, and primed metal.
1. Two top coats and one coat primer.
2. Top Coat(s): Exterior Latex; MPI #10, 11, 15, 119, or 214.

2.04 ACCESSORY MATERIALS

A. Accessory Materials: Provide primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials as required for final completion of painted surfaces.

B. Patching Material: Latex filler.

C. Fastener Head Cover Material: Latex filler.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that surfaces are ready to receive work as instructed by the product manufacturer.

B. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially effect proper application.

C. Test shop-applied primer for compatibility with subsequent cover materials.

D. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces are below the following maximums:
   1. Fiber Cement Siding: 12 percent.
   2. Masonry, Concrete, and Concrete Masonry Units: 12 percent.
   3. Exterior Wood: 15 percent, measured in accordance with ASTM D4442.

3.02 PREPARATION

A. Clean surfaces thoroughly and correct defects prior to application.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

C. Remove or mask surface appurtenances, including electrical plates, hardware, light fixture trim, escutcheons, and fittings, prior to preparing surfaces for finishing.

D. Seal surfaces that might cause bleed through or staining of topcoat.

E. Remove mildew from impervious surfaces by scrubbing with solution of tetra-sodium phosphate and bleach. Rinse with clean water and allow surface to dry.

F. Concrete:

G. Masonry:

H. Fiber Cement Siding: Remove dirt, dust and other foreign matter with a stiff fiber brush. Do not coat surfaces if moisture content or alkalinity of surfaces to be coated exceeds that permitted in manufacturer's written instructions.

I. Exterior Wood Surfaces to Receive Opaque Finish: Remove dust, grit, and foreign matter. Seal knots, pitch streaks, and sappy sections. Fill nail holes with tinted exterior calking compound after prime coat has been applied. Back prime concealed surfaces before installation.

3.03 APPLICATION

A. Exterior Wood to Receive Opaque Finish: If final painting must be delayed more than 2 weeks after installation of woodwork, apply primer within 2 weeks and final coating within 4 weeks.

B. Apply products in accordance with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual".

C. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.

D. Apply each coat to uniform appearance.

E. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.

F. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

3.04 FIELD QUALITY CONTROL

A. See Section 01 4000 - Quality Requirements, for general requirements for field inspection.

3.05 CLEANING

A. Collect waste material that could constitute a fire hazard, place in closed metal containers, and remove daily from site.

3.06 PROTECTION

A. Protect finishes until completion of project.

B. Touch-up damaged finishes after Substantial Completion.

3.07 SCHEDULE - PAINT SYSTEMS

A. Exterior: Fiber Cement Siding: Finish new surfaces exposed to view.

B. Wood: Finish existing surfaces affected by exterior modifications.

C. Steel Fabrications: Finish surfaces exposed to view, except prefinished metal.

D. Exterior steel ladder: See section 09 9600

END OF SECTION

SECTION 09 9123
INTERIOR PAINTING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Surface preparation.

B. Field application of paints.

C. Scope: Finish interior surfaces exposed to view, unless fully factory-finished and unless otherwise indicated.

D. Do Not Paint or Finish the Following Items:
   1. Items factory-finished unless otherwise indicated; materials and products having factory-applied primers are not considered factory finished.
   2. Items indicated to receive other finishes.
   3. Items indicated to remain unfinished.
   4. Fire rating labels, equipment serial number and capacity labels, bar code labels, and operating parts of equipment.
   5. Floors, unless specifically indicated.
   6. Glass.
   7. Concealed pipes, ducts, and conduits.

1.02 RELATED REQUIREMENTS

A. Section 05 5000 - Metal Fabrications: Shop-primed items.

B. Section 09 9113 - Exterior Painting.

C. Section 09 9600 - High-Performance Coatings.

1.03 REFERENCE STANDARDS

A. ASTM D4442 - Standard Test Methods for Direct Moisture Content Measurement of Wood and Wood-Based Materials; 2020.

B. MPI (APL) - Master Painters Institute Approved Products List; Master Painters and Decorators Association; Current Edition.

C. MPI (APSM) - Master Painters Institute Architectural Painting Specification Manual; Current Edition.

D. SSPC-SP 1 - Solvent Cleaning; 2015, with Editorial Revision (2016).

E. SSPC-SP 6 - Commercial Blast Cleaning; 2007.

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide complete list of products to be used, with the following information for each:
   1. Manufacturer's name, product name and/or catalog number, and general product category (e.g., "alkyd enamel").
   2. MPI product number (e.g., MPI #47).
   3. Cross-reference to specified paint system(s) product is to be used in; include description of each system.

C. Maintenance Data: Submit data including finish schedule showing where each product/color/finish was used, product technical data sheets, material safety data sheets (MSDS), care and cleaning instructions, touch-up procedures, repair of painted and finished surfaces, and color samples of each color and finish used.

D. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
   1. See Section 01 6000 - Product Requirements, for additional provisions.

2. Extra Paint and Finish Materials: 1 gallon (4 L) of each color; from the same product run, store where directed.
3. Label each container with color in addition to the manufacturer's label.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified, with minimum three years documented experience.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.

B. Container Label: Include manufacturer's name, type of paint, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.

C. Paint Materials: Store at minimum ambient temperature of 45 degrees F (7 degrees C) and a maximum of 90 degrees F (32 degrees C), in ventilated area, and as required by manufacturer's instructions.

1.07 FIELD CONDITIONS

A. Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by the paint product manufacturer.

B. Follow manufacturer's recommended procedures for producing best results, including testing of substrates, moisture in substrates, and humidity and temperature limitations.

C. Provide lighting level of 80 ft candles (860 lx) measured mid-height at substrate surface.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Provide paints and finishes used in any individual system from the same manufacturer; no exceptions.

B. Paints:
1. Base Manufacturer: Sherwin-Williams Company: www.sherwin-williams.com.
2. Behr Process Corporation: www.behr.com/#sle.
3. Miller Paint Company: www.millerpaint.com

C. Substitutions: See Section 01 6000 - Product Requirements.

2.02 PAINTS AND FINISHES - GENERAL

A. Paints and Finishes: Ready-mixed, unless intended to be a field-catalyzed paint.
1. Where MPI paint numbers are specified, provide products listed in Master Painters Institute Approved Product List, current edition available at www.paintinfo.com, for specified MPI categories, except as otherwise indicated.
2. Provide paints and finishes of a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating, with good flow and brushing properties, and capable of drying or curing free of streaks or sags.
3. Provide materials that are compatible with one another and the substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.
4. Supply each paint material in quantity required to complete entire project's work from a single production run.
5. Do not reduce, thin, or dilute paint or finishes or add materials unless such procedure is specifically described in manufacturer's product instructions.

B. Colors: As indicated on drawings.
1. In finished areas, finish pipes, ducts, conduit, and equipment the same color as the wall/ceiling under which they are mounted.

2.03 PAINT SYSTEMS - INTERIOR

2.04 ACCESSORY MATERIALS

A. Accessory Materials: Provide primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials as required for final completion of painted surfaces.

B. Patching Material: Latex filler.

C. Fastener Head Cover Material: Latex filler.

PART 3 EXECUTION

3.01 EXAMINATION

A. Do not begin application of paints and finishes until substrates have been adequately prepared.

B. Verify that surfaces are ready to receive work as instructed by the product manufacturer.

C. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially affect proper application.

D. Test shop-applied primer for compatibility with subsequent cover materials.

E. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces is below the following maximums:
   1. Gypsum Wallboard: 12 percent.
   2. Plaster and Stucco: 12 percent.
   3. Interior Wood: 15 percent, measured in accordance with ASTM D4442.

3.02 PREPARATION

A. Clean surfaces thoroughly and correct defects prior to application.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

C. Remove or mask surface appurtenances, including electrical plates, hardware, light fixture trim, escutcheons, and fittings, prior to preparing surfaces or finishing.

D. Seal surfaces that might cause bleed through or staining of topcoat.

E. Gypsum Board: Fill minor defects with filler compound. Spot prime defects after repair.

F. Ferrous Metal:
   1. Solvent clean according to SSPC-SP 1.
   2. Remove rust, loose mill scale, and other foreign substances using using methods recommended in writing by paint manufacturer and blast cleaning according to SSPC-SP 6 "Commercial Blast Cleaning". Protect from corrosion until coated.

3.03 APPLICATION

A. Apply products in accordance with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual".

B. Where adjacent sealant is to be painted, do not apply finish coats until sealant is applied.

C. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.

D. Apply each coat to uniform appearance in thicknesses specified by manufacturer.

E. Sand wood and metal surfaces lightly between coats to achieve required finish.

F. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.

G. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

3.04 CLEANING

A. Collect waste material that could constitute a fire hazard, place in closed metal containers, and remove daily from site.

3.05 PROTECTION

3.06 SCHEDULE - PAINT SYSTEMS

A. Interior Gypsum Board: Finish surfaces exposed to view.
   1. Ceilings: MPI Gloss Level 2
   2. Walls: MPI Gloss Level 4

B. Interior Grilles, Trim, Doors, and Frames: Finish surfaces exposed to view
   1. MPI Gloss Level 5

3.07 SCHEDULE - MPI PAINT SYSTEMS

3.08 COLOR SCHEDULE

A. Kitchen Ceiling: SW 7005

B. Kitchen Walls, Doors, and Trim except Lockers and Screen Door: SW 7671

END OF SECTION

SECTION 09 9600
HIGH-PERFORMANCE COATINGS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. High performance coatings.

B. Surface preparation.

1.02 RELATED REQUIREMENTS

A. Section 09 9113 - Exterior Painting.

1.03 REFERENCE STANDARDS

A. MPI (APL) - Master Painters Institute Approved Products List; Master Painters and Decorators Association; Current Edition.

B. MPI (APSM) - Master Painters Institute Architectural Painting Specification Manual; Current Edition.

C. SSPC-SP 1 - Solvent Cleaning; 2015, with Editorial Revision (2016).

D. SSPC-SP 2 - Hand Tool Cleaning; 2018.

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements for submittal procedures.

B. Product Data: Provide complete list of all products to be used, with the following information for each:
   1. Manufacturer's name, product name and/or catalog number, and general product category (e.g. "alkyd enamel").
   2. MPI product number (e.g. MPI #47).
   3. Cross-reference to specified coating system(s) product is to be used in; include description of each system.

C. Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention.

D. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
   1. See Section 01 6000 - Product Requirements, for additional provisions.
   2. Extra Coating Materials: 1 gallon (4 liters) of each type and color.
   3. Label each container with manufacturer's name, product number, color number, and room names and numbers where used.

1.05 QUALITY ASSURANCE

1.06 DELIVERY, STORAGE, AND HANDLING

A. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.

B. Container Label: Include manufacturer's name, type of coating, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.

C. Coating Materials: Store at minimum ambient temperature of 45 degrees F (7 degrees C) and a maximum of 90 degrees F (32 degrees C), in ventilated area, and as required by manufacturer's instructions.

1.07 FIELD CONDITIONS

A. Do not install materials when temperature is below 55 degrees F (13 degrees C) or above 90 degrees F (32 degrees C).

B. Maintain this temperature range, 24 hours before, during, and 72 hours after installation of coating.

C. Restrict traffic from area where coating is being applied or is curing.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Only materials (primers, coatings, etc.) listed in the latest edition of the MPI Approved Product List (APL) are acceptable for use on this project.

B. Provide high performance coating products from the same manufacturer to the greatest extent possible.

C. High-Performance Coatings:
   1. Substitutions: Section 01 6000 - Product Requirements.

2.02 TOP COAT MATERIALS

A. Coatings - General: Provide complete multi-coat systems formulated and recommended by manufacturer for the applications indicated, in the thicknesses indicated; number of coats specified does not include primer or filler coat.

B. Epoxy Coating for exterior ladder:
   1. Number of coats: Two.
   2. Top Coat(s): High Performance Institutional, Two-Component, Water Based Epoxy Coating; MPI #252, #254, #255, #256.
      a. Sheen: Semi-Gloss.
      b. Products:
         1) Sherwin-Williams; Pro Industrial Water Based Catalyzed Epoxy: www.protective.sherwin-williams.com/#sle. (MPI #254)
         2) Substitutions: Section 01 6000 - Product Requirements.

C. Shellac: Pure, white type.

2.03 PRIMERS

A. Primers: Provide the following unless other primer is required or recommended by coating manufacturer.
   1. Primer for Galvanized Metal, Water Based; MPI #134.

2.04 ACCESSORY MATERIALS

A. Accessory Materials: Provide primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials as required for final completion of coated surfaces.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work.

B. Do not begin application of coatings until substrates have been properly prepared.

C. Verify that substrate surfaces are ready to receive work as instructed by the coating manufacturer. Obtain and follow manufacturer's instructions for examination and testing of substrates.

D. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially affect proper application.

3.02 PREPARATION

A. Clean surfaces of loose foreign matter.

B. Remove substances that would bleed through finished coatings. If unremovable, seal surface with shellac.

C. Remove finish hardware, fixture covers, and accessories and store.

D. Galvanized Surfaces:

1. Remove surface contamination and oils and wash with solvent according to SSPC-SP 1.
2. Prepare surface according to SSPC-SP 2.

E. Protect adjacent surfaces and materials not receiving coating from spatter and overspray; mask if necessary to provide adequate protection. Repair damage.

3.03 PRIMING

A. Apply primer to all surfaces, unless specifically not required by coating manufacturer. Apply in accordance with coating manufacturer's instructions.

3.04 COATING APPLICATION

A. Apply coatings in accordance with manufacturer's written instructions, to thicknesses specified and recommendations in MPI - Architectural Painting and Specification Manual.

B. Apply in uniform thickness coats, without runs, drips, pinholes, brush marks, or variations in color, texture, or finish. Finish edges, crevices, corners, and other changes in dimension with full coating thickness.

3.05 CLEANING

A. Collect waste material that could constitute a fire hazard, place in closed metal containers, and remove daily from site.

B. Clean surfaces immediately of overspray, splatter, and excess material.

C. After coating has cured, clean and replace finish hardware, fixtures, and fittings previously removed.

3.06 PROTECTION

A. Protect finished work from damage.

3.07 SCHEDULE

A. Colors: Color match existing metal roof and fascia.

END OF SECTION

SECTION 11 4000
FOODSERVICE EQUIPMENT

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Foodservice equipment.

B. Connections to utilities.

1.02 RELATED REQUIREMENTS

A. Section 07 9200 - Joint Sealants: Sealing joints between equipment and adjacent walls, floors, and ceilings.

B. Section 11 4001 - Custom Fabricated Foodservice Equipment.

C. Section 23 3813 - Commercial-Kitchen Hoods: Range and dishwasher hoods for commercial kitchens.

D. Section 26 0583 - Wiring Connections: Electrical characteristics and wiring connections.

1.03 REFERENCE STANDARDS

A. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2015.

B. FM (AG) - FM Approval Guide; current edition.

C. ITS (DIR) - Directory of Listed Products; current edition.

D. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

E. NFPA 96 - Standard for Ventilation Control and Fire Protection of Commercial Cooking Operations; 2021.

F. SMACNA (KVS) - Kitchen Ventilation Systems and Food Service Equipment Fabrication and Installation Guidelines; 2001.

G. UL (DIR) - Online Certifications Directory; Current Edition.

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data on appliances; indicate configuration, sizes, materials, finishes, locations, and utility service connection locations, service characteristics, and wiring diagrams.

C. Manufacturer's Installation Instructions: Indicate special procedures, perimeter conditions requiring special attention.

D. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacture of standard products of the type specified.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Store products clear of floor in a manner to prevent damage.

B. Coordinate size of access and route to place of installation.

1.07 WARRANTY

A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Foodservice Equipment:
   1. Hobart Corp: www.hobartcorp.com/#sle.
   2. Substitutions: See Section 01 6000 - Product Requirements.

2.02 REGULATORY REQUIREMENTS

A. Comply with applicable codes for utility requirements.

B. Products Requiring Electrical Connection: Listed and classified by FM (AG), ITS (DIR), UL (DIR), or testing agency acceptable to local authorities having jurisdiction as suitable for the purpose specified and indicated.

2.03 EQUIPMENT

A. Equipment Schedule: Refer to schedule at end of this section.

B. Installation Accessories: Provide rough-in hardware, supports and connections, attachment devices, closure trim, and accessories as required for complete installation.

2.04 MATERIALS

A. Stainless Steel Sheet: ASTM A666 Type 304 commercial grade, No. 4 finish.

B. Finish Hardware: Manufacturer's standard.

C. Fittings: Sink drains with crumb cup and waste fittings.

D. Service Outlet Covers and Escutcheons: Stainless Steel.

2.05 FABRICATION

A. Install rubber button feet on bearing surface of any item positioned on a finished surface.

B. Provide indirect drain piping from equipment to terminate over nearest waste receptor.

C. Accommodate site installation of other services or equipment.

2.06 FINISHES

A. Stainless Steel: No. 4 finish.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify ventilation outlets, service connections, and supports are correct and in required location.

B. Verify that electric power is available and of the correct characteristics.

3.02 INSTALLATION

A. Install items in accordance with manufacturers' instructions.

B. Insulate to prevent electrolysis between dissimilar metals.

3.03 ADJUSTING

A. Adjust equipment and apparatus to ensure proper working order and conditions.

B. Remove and replace equipment creating excessive noise or vibration.

3.04 CLEANING

A. Remove masking or protective covering from stainless steel and other finished surfaces.

B. Wash and clean equipment.

C. Polish glass, plastic, hardware, accessories, fixtures, and fittings.

3.05 CLOSEOUT ACTIVITIES

A. At completion of work, provide qualified and trained personnel to demonstrate operation of each item of equipment and instruct Owner in operating procedures and maintenance.
   1. Test equipment prior to demonstration.

3.06 FOODSERVICE EQUIPMENT SCHEDULE

A. See Food Service Shedules and Sheets K-0 through K-6:

END OF SECTION

08/24/2022

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CITY OF LA CENTER –
COMMUNITY CENTER KITCHEN
La Center, WA

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Division 23 – Heating, Ventilating, and Air Conditioning (HVAC)

SECTION 22 0000
BASIC PLUMBING REQUIREMENTS

PART 1 GENERAL

1.01 DESCRIPTION OF WORK

A. This Section specifies the basic requirements for all Contractor installed equipment. It applies to all sections included in Division 22. The requirements herein are an expansion upon the requirements of Division 1.

B. Provide all materials, labor and equipment required to install complete and fully operational plumbing systems as indicated by the contract drawings and this specification.

C. Obtain and pay for all permits, licenses, fees and taxes applicable to this project as required by law.

D. Cooperate with other trades in furnishing material and information required for installation and operation of mechanical items.

E. Requirements for the following are included:
   1. Related work (other Contract Documents and specification sections) that must be combined with the requirements of this Section.
   2. Design performance.
   3. Delivery, storage, and handling.
   4. Quality assurance and standards.
   5. Submittals.
   6. Product quality, basic type, and finishes.
   7. Equipment identification.
   8. Excavation and backfill.
   9. Installation.
   10. Mounting and shimming.
   11. Inspection.
   12. Safety considerations.
   13. Cleaning, startup, and adjustments.

1.02 RELATED WORK

A. This general section shall be used in conjunction with the following other specifications and related Contract Documents to establish the total requirements for the project equipment and systems:
   1. Division 1 sections included in this Project specifications.
   2. The Contract.
   3. General and specific mechanical specifications and drawings included in the project.

1.03 DEFINITIONS

A. “Indicated”: Refers to graphic representations, notes or schedules in the Drawings; or to other paragraphs or schedules in Specifications and similar requirements in the Contract Documents.
   1. Terms such as “shown”, “noted”, “scheduled”, and “specified”, are used to notify or help the user to locate reference. Location is not limited.

B. “Directed”: Terms such as “directed”, Requested”, “authorized”, “selected”, “approved”, “required”, and “permitted” mean directed by Architect/Engineer, approved by Architect/Engineer and similar phrases.

C. “Approved”: When used in conjunction with Architect/Engineer's action on contract submittals, applications, requests, is limited to Architect/Engineer's duties and responsibilities as stated in the Conditions of the Contract.

D. “Regulations”: Includes laws, ordinances, statutes and lawful orders issued by authorities having jurisdiction, as well as rules, conventions and agreements within the construction

industry that control performance of Work.

E. “Furnish”: Means to supply and deliver to the Project site, ready for unloading, unpacking, assembly, installation and similar operations.

F. “Install”: Describes operations at Project site including actual unloading, temporary storage, unpacking, assembling, erecting, placing, anchoring, supporting, isolating, applying, working to dimension, finishing, curing, protecting, cleaning and similar operations.

G. “Provide”: Means to furnish and install.

H. “Installer”: A contractor, or another entity engaged by the contractor, either as an employee, subcontractor, or contractor of a lower tier, to perform a particular construction activity including installation, erection, application or similar operations.

1. Installers are required to be experienced in operations they are engaged to perform.
2. The term “experience” means having successfully completed a minimum of three previous projects similar in scope and size to this Project and within the time frame indicated in the “Quality Assurance” section of the Specifications. In addition, in means being familiar with special requirements indicated and having complied with requirements of authorities having jurisdiction.

I. “Project Site”: Is defined as the space available to the Contractor for performing construction activities, either exclusively or in conjunction with others performing other work as part of Project.

1.04 DESIGN PERFORMANCE

A. Compliance by the Contractor and/or Vendor with the provisions of this Specification does not relieve him of the responsibilities of furnishing equipment and materials of proper design, mechanically suited to meet operating guarantees at the specified service conditions.

1.05 SUBMITTALS

A. Product Data: Submit complete sets of manufacturer's product data in .PDF format for approval. All submittals are to be received in no more than (3) three packages. See Division 1 for further information regarding submittal requirements. Literature submitted shall clearly indicate the model number, capacity, rated operating conditions, noise levels, size, weight, support requirements, rough-in data and dimensions, electrical power requirements, wiring diagrams, utility (fuel, air, cooling water, etc.) requirements, and options furnished. Submittals shall include, but are not necessarily limited to the following;

1. Plumbing: Piping and insulation; Plumbing fixtures, including trim; insulation; valves; hangers and supports; equipment bases; isolators; water heaters; booster pumps and the like.

B. Operation and Maintenance Data: Submit three complete sets of manufacturer's literature in .PDF format for approval. Data shall include installation, start-up, and maintenance instructions, parts lists, and wiring diagrams. Include all material on a CD-ROM or USB device.

C. Substitutions: System design was based upon the equipment and materials listed on the drawings and specifications herein. At contractor's option, another manufacturer's equipment of similar quality, capacity and features may be submitted for prior approval per Section 01 60 00. Prior permission to substitute does not relieve the contractor of the responsibility of including this information in the bound submittal packages.

1.06 QUALITY ASSURANCE

A. Codes and Standards: Comply with the provisions of the following codes, standards and specifications, except where more stringent requirements are shown or specified:

1. State of Washington "IBC".
2. State of Washington "IMC".
3. State of Washington "UPC".
4. State of Washington "IFC".

5. ANSI/ASHRAE 90 - “Energy Efficient Design of New Buildings….”
6. ANSI B31.9 "Building Service Piping".
7. NFPA 54.

B. Drawings: All drawings are diagrammatic and show general design, arrangement, and extent of the systems. Do not scale drawings for rough-in dimensions, nor use as shop drawings.

C. Installer Qualifications: Company specializing in performing the work required with a minimum of five years documented experience.

D. Contractor shall furnish and install all work in accordance with manufacturers' recommendations and instructions.

1.07 DELIVERY, STORAGE AND PROTECTION

A. Delivery: Deliver to site with manufacturer's labels intact and legible.

B. Preparation for shipment:

1. Each unit shall be suitably prepared for the shipment specified and for storage in accordance with manufacturer's instructions in a manner requiring no disassembly prior to operation.
2. The Contractor shall be solely responsible for the adequacy of the Preparation for Shipment provisions employed with respect to materials and application.
3. One complete set of Installations, Operating and Maintenance Instructions shall be packed and shipped with the equipment. This set is in addition to the sets that are to be sent directly to the Owner.

C. Handling: Avoid damage. Comply with manufacturer's installation instruction requirements for rigging, unloading and transporting units.

D. Storage: Inside protected from weather, dirt and construction dust. Where necessary to store outside, elevate well above grade and enclose with durable, waterproof wrapping. Cap all pipe ends. Taping pipe ends is not adequate or allowable.

1.08 PROJECT CONDITIONS

A. General: Provide products which are compatible with other portions of the work and provide products with the proper power characteristics and similar adaptations for the project.

B. Arrangement: Arrange piping parallel with primary lines of the building construction and with a minimum 7 feet overhead clearance in unfinished equipment rooms where possible. Conceal all piping where possible unless indicated otherwise. Locate operating and control equipment properly to provide easy access for operation and maintenance. Give right-of-way to piping which must be sloped for drainage. Set all equipment level or as recommended by manufacturer.

C. Coordination: Where several elements of the work must be sequenced and positioned in order to fit the available space, prepare shop drawings showing the actual physical dimensions (at accurate scale) required for installation and submit prior to purchase/fabrication/installation of any of the elements involved in the coordination.

1.09 STANDARDS

A. General: Provide all new materials and equipment, identical to apparatus or equipment in successful operation for a minimum of five years. Provide materials of comparable quality omitted here but necessary to complete the work. Maximum allowable variation from stated capacities, minus 5% to plus 10% as approved in each case.

B. Governing Standards: The following are typical standards generally referenced in these specifications and identified by their acronym. Federal Specifications (FS), American Society for Testing Materials (ASTM), American National Standards Institute (ANSI), Manufacturer's Standardization Society of the Valve and Fitting Industry, Standard Practice (MSS SP-69), Cast Iron Soil Pipe Institute (CISPI), Underwriters Laboratory (UL) numbers are given.

1.10 WARRANTIES

A. Contractor shall provide a 1 year warranty on all equipment, materials and workmanship for a period of one year from the date of owner's acceptance.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 LAYOUT AND COORDINATION

A. Site Examination: Before starting work, carefully examine site and all Contract Drawings. Become thoroughly familiar with conditions governing work on this project. Verify all indicated elevations, building measurements, rough-in dimensions and equipment locations before proceeding with any work.

B. Utility Locations: The location of all utilities, wires, conduits, pipes, ducts, or other service facilities are shown in a general way only on the drawings and in some instances are taken from existing drawings. Ascertain whether any additional facilities other than those shown on the plans may be present and determine the exact location and elevations of all utilities prior to commencing installation.

C. Discrepancies: Any error, omission, conflict or discrepancy in Drawings, Specifications and/or existing conditions shall be reported immediately. Do not proceed with any questionable items of work until clarification of same has been made. Should rearrangement or re-routing of piping or ductwork be necessary, provide for approval the simplest layout possible for that particular portion of the work. Under no circumstances shall beams, girders, footings or columns be cut for mechanical items. Casting of pipes into concrete is prohibited unless so shown on Drawings.

D. The Contractor shall cooperate with others to avoid interferences and delays in the construction work.

E. Interference as a result of poor coordination or lack of cooperation with other trades shall be corrected at the Contractor's expense.

3.02 CONTINUITY OF EXISTING SERVICES

A. Existing water, power, heat, ventilation, air conditioning and other services shall remain in service during new construction work. Coordinate any interruption in service during new construction work. Coordinate any interruption of these services with the Owner's representative a minimum of twenty-four (24) hours in advance.

B. Protect from damage active utilities existing and evident by reasonable inspection of the site whether shown or not on the Drawings. Protect, relocate or abandon utilities encountered in the work which were not shown on the Drawings or evident by inspection of the work as directed by the Architect. Maintain continuity of all utility services to existing buildings.

3.03 CUTTING AND PATCHING

A. General: Perform cutting and patching in accordance with Division 1.

B. Protection: During cutting and patching, protect adjacent installations. Provide temporary barriers to prevent the spread of dust and dirt outside of the immediate work area.

C. Repair: Patch finished surfaces and building components using new materials to match the existing.

D. Inspection: Upon written direction from the Architect, uncover and restore work to provide for observation of concealed work.

3.04 EXCAVATION AND BACKFILL

A. General: Perform all necessary excavation and backfill required for the installation of mechanical work. Any piping or other work damaged by the Contractor's operations shall be repaired at the Contractor's expense.

B. Water: Keep all excavations free of standing water. Excavations damaged or softened by water or frost shall be re-excavated and filled back to original level with approved material at the

Contractor's expense.

C. Test: During the progress of the work for compacted fill, the Owner reserves the right to request compaction tests made under the direction of a testing laboratory.

D. Trench Excavation: Excavate trenches to the necessary depth and width, removing rocks, unstable soil (silt, peat, etc.) roots and stumps. Width of trench shall be adequate for proper installation of piping or conduit.

E. Foundation and Bedding:
   1. Proper preparation of foundation, placement of foundation material where required, and placement of bedding material shall precede the installation of the pipe. This shall include leveling of the trench bottom as well as placement and compaction of required bedding material to a uniform grade so that piping rests upon a continuous and uniform bedding.
   2. Where excavation has been made below the required grade, the Contractor shall provide, place and compact suitable bedding material to restore the proper grade elevation.

F. Provide tracer wire over top of piping.
   1. Construction:
      a. Conductor: Solid or stranded copper per spec ASTM B-3.
      b. Insulation: High Molecular Weight Polyethylene (HMWPE) ASTM D-1248. Various insulation colors dependant on usage.
      c. Temperature: 70 degrees C dry and wet.
      d. Voltage: 20 and 30 Mil = 30 to 300 volts. 45 Mil = 600 volts.

G. Backfilling: Upon acceptance of installed piping systems, trenches shall be backfilled in lifts. Backfill material shall be placed and compacted in lifts not to exceed 6 inches in depth to a height of 1 inch above the top of trench. Backfill shall be placed to obtain contact with the entire periphery of the pipe without disturbing pipe placement.

H. Compaction: One of the following methods or combination thereof shall be required; 1) Mechanical Tamper or Vibratory Compactor. Compaction shall be sufficient to attain 95% of maximum density at optimum moisture content. Water "puddling" or "washing" is prohibited.

I. Bedding/Backfill Material: Where native material has been removed, necessary foundation material consisting of 3/4 inch minus crushed rock or fill sand shall be placed and compacted to form a firm base of the required thickness. Backfill material shall be the same. Follow the pipe manufacturer's installation instructions when specified materials are specifically prohibited.

3.05 EQUIPMENT REMOVAL

A. All removed equipment is the property of the Contractor unless indicated otherwise. Disconnect and remove all such equipment from the property. Cap all piping in walls, below floors, and/or above ceilings in finished rooms.

B. Where equipment is to be reused, reconnect piping, wiring and/or controls to allow this equipment to function as it had prior to this renovation unless indicated otherwise.

3.06 MECHANICAL EQUIPMENT WIRING

A. Provide all motor starters, control devices, and wiring complete from power source indicated on Drawings.

B. Equipment and systems shown on the Drawings and/or specifications, are based upon requirements of specific manufacturers which are intended as somewhat typical of several makes which may be approved. Provide all field wiring and/or devices necessary for a complete and operable system controls for the actual selected equipment/system.

3.07 INSTALLATION

A. Locating and Positioning Equipment: Observe all Codes and Regulations and good common practice in locating and installing mechanical equipment and material so that completed installation presents the least possible hazard. Maintain recommended clearances for repair

and service to all equipment.

B. Anchorage: Anchor and/or brace all mechanical equipment, piping to resist displacement due to seismic action, include snubbers on equipment mounted on spring isolators.
C. Where mounting heights or locations are not identified, install systems, equipment and materials to provide maximum headroom.
D. Provide clearance for installation of insulation and access to valves, fittings, damper actuators, etc. on pipe and duct systems.
E. Install systems, materials and equipment giving right of way to systems required to be installed at a specific slope or operation by gravity.
F. Provide condensate drain piping to over nearest floor drain for all coils, furnaces, boilers, domestic water heaters and the likes.
G. Flush clean and disinfect domestic water system.
H. Provide chrome plated rigid or flexible supplies to fixtures with stops, reducers, and escutcheons.
I. Provide trap primers and piping for floor drains and floor sinks.
J. Installation shall be in accordance with the requirements of the equipment manufacturer, including special requirements for seismic restraints.
K. Equipment Manufacturer's Responsibility and Services:
    1. A manufacturer's representative for major equipment and operating systems shall be provided as necessary to assist the Contractor during installation, and to provide written certification that the equipment has been installed as specified and in accordance with the manufacturer's representative.
    2. The manufacturer's representative shall provide the initial startup of equipment in the presence of the Owner.
        a. Provide a pre-start check of all piping, valves, control devices, control panels, and equipment.
        b. Calibrate and adjust equipment and controls for operation at the specified design and conditions.
        c. Provide a record of all startup events noting problems and their resolution.
        d. Provide a record of all set points for operational controls and devices.
    3. Upon the completion of the equipment startup, provide instructional time with the Owner's personnel to review the operations and maintenance manuals and perform each step necessary for startup, shutdown, troubleshooting, and routine maintenance. The instructional time shall be scheduled through the Owner.
    4. Upon completion of the inspections, startup, testing, and checkout procedures, the equipment manufacturer shall submit written notice to the Owner that the units are ready for use by the Owner. Provide a certificate of calibration for all equipment.

3.08 MOUNTING AND SHIMMING

A. Mount equipment as shown on the Drawings. Provisions for mounting special equipment on spring isolators, snubbers, and inertia bases are specified in Section 22 05 48, Vibration Isolation and Sound and Seismic Controls for Plumbing Piping and Equipment.
B. Level the equipment by means of 304 stainless steel wedges (stainless steel plates and stainless steel shims). Wedge taper shall not be greater than 1/4 inch per foot. Use double wedges to provide a level bearing surface for the equipment. Secure each pair of wedges in their final positions with one tack weld on each side after leveling is complete. Wedging shall be executed in a manner that will prevent a change in level or springing of the Baseplate when the anchor bolts are tightened.
    1. Adjust rotating equipment assemblies such that the driving units are properly aligned, plumb and level with the driven units and all interconnecting shafts and couplings.

2. All rotating equipment shall be checked for proper alignment with dial indicators or laser after completion of grouting. The alignment must be within the tolerances required by the equipment manufacturer. The final alignment check shall be witnessed by the Owner.

3.09 INSPECTION

A. The Contractor shall inspect his work to ensure the installation and workmanship is in accordance with these specifications and acceptable industry standards for the work being done.

B. All materials, equipment, and workmanship shall be subject to inspection at any time by the Owner. Contractor shall correct any work, materials, or equipment not in accordance with the Contract Documents.

3.10 SAFETY CONSIDERATIONS

A. All equipment shall be installed with suitable access clearances that satisfy OSHA and code requirements for maintenance or removal of replaceable parts and components, and with necessary inions or flanges to perform the maintenance or removal without removing the connecting appurtenances.

B. Where equipment requiring periodic maintenance cannot be reached by normal walkways because of interference with ductwork, piping, or other obstructions the Contractor shall notify the Owner and propose an alternate safe means of access. These may include construction of an overhead platform with stairway or ladder ends and safety railings or handholds, or walk-through duct plenums with hinged access doors, or as required to meet OSHA standards for safe maintenance procedures.

3.11 CLEANING, START-UP, AND ADJUSTING

A. The Contractors shall be responsible for proper operation of all systems, minor subsystems, and services provided under this section. He shall coordinate start-up procedures, calibration, and system checkout with all project managers. Any system operational problems shall be diagnosed; all correctional procedures shall be initiated as required to bring out the system into compliance with the design, and the problem then shall be rechecked to verify that the system operates normally.

B. Thoroughly clean all parts of the installation at the completion of the work. The Contractor shall clean up and remove from the premises all refuse material, crates, and rubbish arising from his work. Remove, clean, and reinstall all filters. Belt-drive tensions and alignments shall be checked. All motors and bearings shall be lubricated in accordance with the manufacturer's service manuals prior to equipment start-up. Provide a lubrication schedule for every item of equipment furnished under this section. The schedule shall include the type of lubricant and the application frequency.

END OF SECTION

SECTION 22 0519
METERS AND GAUGES FOR PLUMBING PIPING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Thermometers and Thermometer Wells.
B. Pressure-Temperature test plugs.

1.02 RELATED REQUIREMENTS

A. Section 22 1005 - PLUMBING PIPING.

1.03 REFERENCE STANDARDS

A. ASME B40.100 - Pressure Gauges and Gauge Attachments 2013.
B. ASTM E1 - Standard Specification for ASTM Liquid-in-Glass Thermometers 2014 (Reapproved 2020).
C. ASTM E77 - Standard Test Method for Inspection and Verification of Thermometers 2014 (Reapproved 2021).
D. NSF 61 - Drinking Water System Components - Health Effects 2021.
E. NSF 372 - Drinking Water System Components - Lead Content 2022.

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements for submittal procedures.
B. Product Data: Provide list that indicates use, operating range, total range and location for manufactured components.
C. Operation and Maintenance Data: See Section 01 7000 - Execution and Closeout Requirements.

PART 2 PRODUCTS

2.01 PRESSURE GAUGES

A. Manufacturers:
   1. Weksler Glass Thermometer Corp; Model 401: www.wekslerglass.com/#sle.
   2. Trerice; Model 700 Series: www.tretice.com.
   3. Ametek (U.S.Gauge); Model Series 540: www.ameteusg.com.
   4. Marshalltown: www.marshalltown.com.
   5. Weiss: www.weissinstruments.com
   6. Ashcroft, Inc: www.ashcroft.com.
   7. Substitutions: See Section 01 6000 - Product Requirements.
B. Bourdon Tube for Liquids and Gases:
   1. Dial Size and Cover: 4-1/2 inch (115 mm) diameter scale with safety glass window.
   2. Dial Text and Markings: Black color on white background with scaled units.
   3. Accuracy: ASME B40.100, adjustable industrial grade (A) with 1 percent at mid-range of span.
   4. Process Connection: Lower-back, 1/4 inch (6.35 mm) NPT male except where noted.
   5. Corrossion Resistant Gauge Wetted Materials: Painted steel case and brass socket rated to match process pressure and temperature range.
   6. Comply with UL 393 when used for fire protection service or UL 404 when used for compressed gas service.
C. Accessories:
   1. Gauge Cock: Brass with tee or lever handle for maximum 150 psi (1034 kPa).
   2. Needle Valve: Brass, 1/4 inch (6 mm) NPT female for noncorrosive service.
   3. Siphon: 213 seamless steel, 1/4 inch (6.35 mm) NPT male for rated capacity.
   4. Pressure Snubber (Pulsation Damper): Brass, 1/4 inch (6.35 mm) NPT male.
   5. Diaphragm Seal: 316L Stainless steel wetted material rated at 125 psi (8.6 bar), threaded. Select top size to match gauge size.

2.02 THERMOMETERS

A. Manufacturers:
   1. Weiss Instruments, LLC: www.weissinstruments.com/#sle.
   2. Weksler Glass Thermometer Corp: www.wekslerglass.com/#sle.
   3. Trerice & Ametek.
   4. Substitutions: See Section 01 6000 - Product Requirements.

B. General:
   1. Product Compliance: ASTM E1.
   2. Lens: Clear glass, except where stated.
   3. Accuracy: Two percent, when tested in accordance with ASTM E77, except where stated.
   4. Scale: Black markings depicting single scale in degrees F where expected process value falls half-span of standard temperature range.

C. Thermometers - Straight with 90-degree Back Angled Stem: 9 inch ([___] mm) v-shape aluminum case with clear glass window scale, 2 inch (50.8 mm) NPT stem, 3-1/4 inch (82.5 mm) NPT thermowell, and red or blue non-toxic organic liquid filled glass tube.

D. Thermometers - Adjustable Angle: 9 inch (228.6 mm) v-shape aluminum case with clear glass window scale, 3-1/2 inch (88.9 mm) NPT stem, red or blue organic non-toxic liquid filled glass tube, and adjustable joint with positive locking device allowing 360 degrees in horizontal plane or 180 degrees in vertical plane adjustments.

E. Thermometers - Dial Type:
   1. Adjustable Angle: 5 inch (125 mm) diameter dial with black pointer, stainless steel case, silicone damping bimetal element, hermetically sealed lens, recalibrating screw, and 2-1/2 inch (63.5 mm) NPT stem.

2.03 PRESSURE-TEMPERATURE TEST PLUGS:

A. Size: 500 psi (34.5 bar) capacity; 1/2 inch (13 mm) MPT brass fitting with gasket, cap, and retaining strap for 1/8 inch (3 mm) pressure gauge or temperature probe.

B. Wetted Materials per Temperature Range:
   1. Up to 200 degrees F (93 degrees C): Brass (lead free) probe with neoprene core.

C. Accessories: Lead-free brass, ball valve, bar stock needle (valve), lever-handle cock, heavy-duty tee handle cock, siphon, snubber-filter, and tee-handle cock.

D. Test Kit: Internally padded carrying case fitted with two 2-1/2 inch (60 mm) diameter pressure gauges, adapters, two 1/8 inch (3 mm) probes, and 1-1/2 inch (38 mm) dual-scale dial thermometers.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verification of Conditions: Verify Utility Service Provider piping readiness to receive meter.

B. Do not install instrumentation when areas are under construction, except for required rough-in, taps, supports, and test plugs.

3.02 INSTALLATION

A. Install pressure gauges as follows:
   1. At Pumps: Place single gauge before strainer, suction side and discharge side.
   2. Include gauge cock and pressure snubber (pulsation-damper) to isolate each gauge and extend nipples for insulation clearance.
   3. Include siphons on high temperature systems and select type according to service rating.
   4. Adjust gauges to selected viewing angle, clean thoroughly, and calibrate to zero.

B. Install thermometers as follows:
   1. Hot Water Heaters: Place upstream and downstream of heater.

END OF SECTION

SECTION 22 0549
PLUMBING SEISMIC RESTRAINT

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Seismic restraint of equipment and piping.

1.02 RELATED SECTIONS

A. Section 22 0000 - Basic Plumbing Requirements.
B. Section 22 0719 - Plumbing Piping Insulation.
C. Section 22 1005 - Plumbing Piping.
D. Section 22 3000 - Plumbing Equipment.
E. Section 22 4000 - Plumbing Fixtures.

1.03 QUALITY ASSURANCE

A. Seismic Restraints:
   1. The Anchorage and/or seismic restraint of permanent equipment and associated systems listed below shall be designed to resist the total design seismic forces prescribed in the latest edition of the International Building Code.
      a. All floor or roof-mounted equipment weighing 400 lbs or greater.
      b. All suspended or wall-mounted equipment weighing 20 lbs or greater.
      c. All vibration-isolated equipment weighing 20 lbs or greater.
      d. All gas piping systems throughout the building.
      e. All piping 1 1/4 inches nominal diameter and larger located in boiler, mechanical equipment and refrigeration mechanical rooms.
      f. All piping 2 1/2 inches nominal diameter and larger.
      g. Pipes, electrical conduit and ducts supported by a trapeze where none of those elements would individually require bracing, require bracing when the combined operating weight of all elements supported by the trapeze is 10 lbs/ft or greater.
B. All calculations shall be in accordance with Chapter 16 of the latest edition of the International Building Code.

1.04 SUBMITTALS

A. Submit the following in accordance with Section 01 3000:
   1. All anchorage and seismic restraints shall be designed and stamped by a professional engineer licensed in the state of the project location. Design shall include:
      a. Number, size and location of anchors for floor or roof-mounted equipment. For curb-mounted equipment, provide design of attachment of both the unit to the curb and the curb to the structure. In addition, provide calculations or test data verifying the curb can accept the seismic loads.
      b. Number, size and location of seismic restraint devices and anchors for vibration-isolated and suspended equipment. Provide calculations or test data verifying the horizontal and vertical ratings of the seismic restraint devices.
      c. Number, size and location of braces and anchors for suspended piping and ductwork on shop drawings. In addition:
         1) The contractor must select a single seismic restraint system pre-designed to meet the requirements of the latest edition of the International Building Code such as the 2011 Mason Industries Seismic Restraint Guidelines for Suspended Piping, Ductwork, Electrical Systems and floor and roof mounted equipment.
         2) Details or designs from separate seismic restraint guidelines are not acceptable. Installations not addressed by the selected system must be designed, detailed and submitted along with the shop drawings.

3) Maximum seismic loads shall be indicated on drawings at each brace location. Drawings shall bear the stamp and signature of the registered professional engineer licensed in the state of the project location who designed the layout of the braces.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Amber Booth.
B. Mason Industries, Inc.
C. Kinetics Corporation.
D. Vibrex.
E. Substitutions: Under provisions of Section 01 6000.

2.02 SEISMIC RESTRAINTS

A. General Requirements:
   1. Seismic restraints shall be provided for all equipment, both supported and suspended, piping and ductwork as listed above.
   2. Bracing of piping and ductwork shall be in accordance with provisions set forth in SMACNA seismic restraint manual.
   3. Structural requirements for restraints, including their attachment to building structure, shall be reviewed and approved by the structural engineer.
   4. Attachments to supported or suspended equipment must be coordinated with the equipment manufacturer.

B. Supported Equipment Products:
   1. Seismic restraints shall consist of interlocking steel members restrained by shock absorbent neoprene materials compounded to bridge bearing specifications as previously noted in paragraph 1.03. Elastomeric materials shall be replaceable and be a minimum 3/4-inch thick. Snubbers shall be manufactured with an air gap between hard and resilient material of not less than 1/8-inch, nor more than 1/4-inch. Type 1 - Seismic Snubbers: All-directional seismic snubbers shall consist of interlocking steel members restrained by a one-piece molded neoprene bushing of bridge bearing neoprene. Bushing shall be replaceable and a minimum of 1/4 inch thick. A minimum air gap of 1/8 inch shall be incorporated in the snubber design in all directions before contact is made between the rigid and resilient surfaces. Snubber end caps shall be removable to allow inspection of internal clearances. The snubber shall be designed to accept horizontal and vertical seismic loads as defined in Section 1.03.B. Mason Type Z-1225 or Z-1011.
   2. Each snubber shall be capable of restraint in all three mutually orthogonal directions. Type 2 - Seismic Sway Braces - Seismic sway braces shall consist of galvanized steel aircraft cables or steel angles/channels. Cables braces shall be designed to resist seismic tension loads and steel braces shall be designed to resist both tension and compression loads with a minimum safety factor of 2. Brace end connections shall be steel assemblies that swivel to the final installation angle. Do not mix cable and steel braces to brace the same system or equipment. Steel angles, when required, shall be clamped to the threaded hanger rods at the seismic sway brace locations utilizing a minimum of two ductile iron clamps. Sway braces shall be designed to accept horizontal and vertical seismic loads as defined in Section 1.03.B. Mason Type SCB, SSB, SRC and UC.
   3. Submittals shall include load versus deflection curves up to 1/2-inch on the x, y and z planes.
   4. Mason Model Z-1011

C. Bracing of Pipes:

1. Provide seismic bracing of all piping as detailed below. (Exception: Piping suspended by individual hangers 12 inches or less in length, as measured from the top of the pipe to the bottom of the support where the hanger is attached, need not be braced).
   a. Brace all gas piping.
   b. Brace all piping located in boiler rooms, mechanical equipment rooms, and refrigeration mechanical rooms that is 1-1/4-inch nominal diameter and larger.
   c. Brace all pipes 2-1/2-inch nominal diameter and larger.
2. For all gas piping, as specified in 1(a) the bracing details, schedules, and notes may be used, except that transverse bracing shall be at 20 feet maximum, and longitudinal bracing shall be at 40 feet maximum.
3. Seismic braces for pipes on trapeze hangers may be used.
4. Provide flexibility in joints where pipes pass through building seismic joints or expansion joints or where rigidly supported pipes connect to equipment with vibration isolators. For threaded piping, the flexibility may be provided by the installation of swing joints.
5. Cast iron pipe of all types, glass pipe, and any other pipe jointed with a shield and clamp assembly, where the top of the pipe is 12 inches or more from the supporting structure, shall be braced on each side of a change in direction of 90 degrees or more. Riser joints shall be braced or stabilized between floors.
6. Vertical risers shall be laterally supported with a riser clamp at each floor. For buildings greater than six stories high, all risers shall be engineered individually.

D. Suspended Equipment and Piping:
1. Cable Method: The seismic restraint shall consist of a combination of stranded steel aircraft cable and the specified vibration isolation hanger with an added nut and neoprene and steel washer. The cable resists lateral and downward motion. The modified vibration hanger resists upward motion.
2. Cable attachment details, cable size, and the neoprene and steel washers shall be sized by the manufacturer and are to be indicated in the Shop Drawings.
3. Provide detailed Shop Drawings for approval in sufficient time to allow structural attachment work to be incorporated into the normal work sequence.

PART 3 EXECUTION

3.01 SEISMIC RESTRAINTS

A. General:
1. Install and adjust seismic restraints so that the equipment, piping, supports are not degraded by the restraints.
2. Restraints must not short circuit vibration isolation systems or transmit objectionable vibration or noise.

B. Supported Equipment:
1. Each vibration isolation frame for supported equipment shall have a minimum of four seismic snubbers mounted as close as possible to the vibration isolators and/or the frame extremities.
2. Care must be taken so that a minimum 1/8-inch air gap in the seismic restraint snubber is preserved on all sides in order that the vibration isolation potential of the isolator is not compromised. This requires that the final snubber adjustment be completed after the vibration isolators are properly installed and the installation approved.

C. Bracing of Pipes:
1. Branch lines may not be used to brace main lines.
2. Transverse bracing shall be at 40 feet maximum except where a lesser spacing is indicated in the SMACNA tables for bracing of pipes.

3. Longitudinal bracing shall be at 80 feet maximum except where a lesser spacing is indicated in the tables. In pipes where thermal expansion is a consideration, an anchor point may be used as the specified longitudinal brace provided that it has a capacity equal to or greater than a longitudinal brace. The longitudinal braces and connections must be capable of resisting the additional force induced by expansion and contraction.
4. A rigid piping system shall not be braced to dissimilar parts of the building or to two dissimilar building systems that may respond differently during an earthquake.
5. Transverse bracing for one pipe section may also act as longitudinal bracing for a pipe section of the same size connected perpendicular to it if the bracing is installed within 24 inches of the elbow or tee.

D. Suspended Equipment and Piping Cable Method:
1. Cables shall be adjusted to a degree of slackness approved by the Structural Engineer.
2. Uplift and downward restraint nuts and washers for the Type HST hangers shall be adjusted so that there is a minimum 1/4-inch clearance.

END OF SECTION

SECTION 22 0553
IDENTIFICATION FOR PLUMBING PIPING AND EQUIPMENT

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Nameplates.
B. Tags.
C. Pipe markers.
D. Labels.
E. Lockout devices

1.02 RELATED REQUIREMENTS

A. Section 09 9123 - Interior Painting: Identification painting.

1.03 REFERENCE STANDARDS

A. ASME A13.1 - Scheme for the Identification of Piping Systems 2020.
B. ASTM D709 - Standard Specification for Laminated Thermosetting Materials 2017.

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements for submittal procedures.
B. Schedules:
   1. Submit plumbing component identification schedule listing equipment, piping, and valves.
   2. Detail proposed component identification data in terms of of wording, symbols, letter size, and color coding to be applied to corresponding product.
   3. Valve Data Format: Include id-number, location, function, and model number.
C. Product Data: Provide manufacturers catalog literature for each product required.
D. Manufacturer's Installation Instructions: Indicate special procedures, and installation.
E. Project Record Documents: Record actual locations of tagged valves.

PART 2 PRODUCTS

2.01 NAMEPLATES

A. Manufacturers:
   1. Brady Corporation: www.bradycorp.com.
   2. Safety Sign Company: www.safetysignco.com.
   3. Seton Identification Products: www.seton.com/#sle.
   4. Substitutions: See Section 01 6000 - Product Requirements.
B. Description: Laminated three-layer plastic with engraved letters.
   1. Letter Color: Black.
   2. Letter Height: 1/2 inch (13 mm).
   3. Background Color: Yellow.
   4. Nameplate Material:
      a. Flexible: Plastic per ASTM D709.

2.02 TAGS

A. Manufacturers:
   1. Brady Corporation: www.bradycorp.com.
   2. Safety Sign Company: www.safetysignco.com.
   3. Seton Identification Products: www.seton.com/#sle.
   4. Substitutions: See Section 01 6000 - Product Requirements.
B. Flexible: Laminated three-layer Plastic with engraved black letters on light contrasting background color. Minimum tag size 1-1/2 inch (40 mm) in diameter.
C. Metal: Brass with stamped letters, tag size minimum 1-1/2 inch (40 mm) in diameter.
D. Valve Tag Chart: Typewritten letter size list in anodized aluminum frame.

2.03 PIPE MARKERS

A. Comply with ASME A13.1.

B. Plastic Marker: Factory fabricated, flexible, semi-rigid, preformed to fit around pipe or pipe covering; minimum information indicating flow direction arrow and identification of fluid conveyed.
C. Plastic Tape Marker: Flexible, vinyl film tape with pressure-sensitive adhesive backing and printed markings.
D. Underground Plastic Marker: Bright-colored continuously printed ribbon tape, minimum 6 inches (150 mm) wide by 4 mil (0.10 mm) thick, manufactured for direct burial service.

2.04 LABELS

A. Description: Aluminum, size 1.9 x 0.75 inches, adhesive backed with printed identification.

2.05 LOCKOUT DEVICES

A. Lockout Hasps:
   1. Manufacturers:
   2. Anodized aluminum or reinforced nylon hasp with erasable label surface; size minimum 7-1/4 x 3 inches.
B. Valve Lockout Devices:
   1. Steel device preventing access to valve operator, accepting lock shackle.

PART 3 EXECUTION

3.01 PREPARATION

A. Degrease and clean surfaces to receive identification products.

3.02 INSTALLATION

A. Install plastic nameplates with corrosive-resistant mechanical fasteners, or adhesive. Apply with sufficient adhesive to ensure permanent adhesion and seal with clear lacquer.
B. Install tags with corosion resistant chain.
C. Install tags in clear view and align with axis of piping
D. Install plastic pipe markers in accordance with manufacturer's instructions.
E. Install plastic tape pipe marker around pipe in accordance with manufacturer's instructions.
F. Install underground plastic pipe markers 6 to 8 inches (150 to 200 mm) below finished grade, directly above buried pipe.
G. Identify pumps, heat transfer equipment, tanks, and water treatment devices with 8 x 4 inch plastic nameplates. Small devices, such as in-line pumps, may be identified with tags.
H. Identify control panels and major control components outside panels with plastic nameplates.
I. Identify valves in main and branch piping with tags.
J. Identify piping, concealed or exposed, with plastic pipe markers. Use tags on piping 3/4 inch diameter and smaller. Identify service, flow direction. Locate identification not to exceed 20 feet on straight runs including risers and drops, adjacent to each valve and Tee, at each side of penetration of structure or enclosure, and at each obstruction.

END OF SECTION

SECTION 22 0719
PLUMBING PIPING INSULATION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Glass fiber insulation.
B. Jacketing and accessories.

1.02 RELATED REQUIREMENTS

A. Section 22 1005 - PLUMBING PIPING: Placement of hangers and hanger inserts.

1.03 REFERENCE STANDARDS

A. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar 2015.
B. ASTM C195 - Standard Specification for Mineral Fiber Thermal Insulating Cement 2007 (Reapproved 2019).
C. ASTM C449 - Standard Specification for Mineral Fiber Hydraulic-Setting Thermal Insulating and Finishing Cement 2007 (Reapproved 2019).
D. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2022.
E. ASTM E96/E96M - Standard Test Methods for Gravimetric Determination of Water Vapor Transmission Rate of Materials 2022.
F. UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials Current Edition, Including All Revisions.

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements for submittal procedures.
B. Product Data: Provide product description, thermal characteristics, list of materials and thickness for each service, and locations.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with not less than three years of documented experience.
B. Applicator Qualifications: Company specializing in performing the type of work specified in this section with minimum 3 years of documented experience.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Accept materials on site, labeled with manufacturer's identification, product density, and thickness.

1.07 FIELD CONDITIONS

A. Maintain ambient conditions required by manufacturers of each product.
B. Maintain temperature before, during, and after installation for minimum of 24 hours.

PART 2 PRODUCTS

2.01 REGULATORY REQUIREMENTS

A. Surface Burning Characteristics: Flame spread index/Smoke developed index of 25/50, maximum, when tested in accordance with ASTM E84 or UL 723.

2.02 GLASS FIBER INSULATION

A. Manufacturers:
   1. Johns Manville Corporation; Micro-Lok HP: www.jm.com/#sle.
   2. Owens Corning Corporation; Model SSL II: www.ocbuildingspec.com/#sle.
   3. Certain Teed Corporation: www.certainteed.com.
   4. Knauf Insulation;Pipe Insulation ASJ-SSL: www.knaufusa.com
   5. Substitutions: See Section 01 6000 - Product Requirements.
B. Vapor Barrier Jacket: White Kraft paper with glass fiber yarn, bonded to aluminized film; moisture vapor transmission when tested in accordance with ASTM E96/E96M of 0.02 perm

(0.029 ng/(Pa s m)).

C. Tie Wire: 0.048 inch (1.22 mm) stainless steel with twisted ends on maximum 12 inch (300 mm) centers.
D. Vapor Barrier Lap Adhesive: Compatible with insulation.
E. Insulating Cement/Mastic: ASTM C195; hydraulic setting on mineral wool.
F. Indoor Vapor Barrier Finish:
   1. Cloth: Untreated; 9 oz/sq yd (305 g/sq m) weight.
   2. Vinyl emulsion type acrylic, compatible with insulation, black color.
G. Outdoor Vapor Barrier Mastic: Vinyl emulsion type acrylic or mastic, compatible with insulation, black color.
H. Outdoor Breather Mastic: Vinyl emulsion type acrylic or mastic, compatible with insulation, black color.
I. Insulating Cement: ASTM C449.

2.03 JACKETING AND ACCESSORIES

A. PVC Plastic Jacket:
   1. Manufacturers:
      a. Johns Manville Corporation: www.jm.com/#sle.
      b. Substitutions: See Section 01 6000 - Product Requirements.
   2. Jacket: One piece molded type fitting covers and sheet material, off-white color.
      a. Minimum Service Temperature: 0 degrees F (Minus 18 degrees C).
      b. Maximum Service Temperature: 150 degrees F (66 degrees C).
      c. Moisture Vapor Permeability: 0.002 perm inch (0.0029 ng/(Pa s m)), maximum, when tested in accordance with ASTM E96/E96M.
      d. Thickness: 20 mil, 0.020 inch (0.50 mm).
      e. Connections: Brush on welding adhesive.
   3. Covering Adhesive Mastic: Compatible with insulation.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that piping has been tested before applying insulation materials.
B. Verify that surfaces are clean and dry, with foreign material removed.

3.02 INSTALLATION

A. Install in accordance with manufacturer's instructions.
B. Install in accordance with North American Insulation Manufacturers Association (NAIMA) National Insulation Standards.
C. Exposed Piping: Locate insulation and cover seams in least visible locations.
D. Insulated pipes conveying fluids below ambient temperature: Insulate entire system including fittings, valves, unions, flanges, strainers, flexible connections, pump bodies, and expansion joints.
E. Glass fiber insulated pipes conveying fluids below ambient temperature:
   1. Provide vapor barrier jackets, factory-applied or field-applied. Secure with self-sealing longitudinal laps and butt strips with pressure-sensitive adhesive. Secure with outward clinch expanding staples and vapor barrier mastic.
   2. Insulate fittings, joints, and valves with molded insulation of like material and thickness as adjacent pipe. Finish with glass cloth and vapor barrier adhesive or PVC fitting covers.
F. For hot piping conveying fluids 140 degrees F (60 degrees C) or less, do not insulate flanges and unions at equipment, but bevel and seal ends of insulation.
G. For hot piping conveying fluids over 140 degrees F (60 degrees C), insulate flanges and unions at equipment.
H. Glass fiber insulated pipes conveying fluids above ambient temperature:

1. Provide standard jackets, with or without vapor barrier, factory-applied or field-applied. Secure with self-sealing longitudinal laps and butt strips with pressure-sensitive adhesive. Secure with outward clinch expanding staples.
2. Insulate fittings, joints, and valves with insulation of like material and thickness as adjoining pipe. Finish with glass cloth and adhesive or PVC fitting covers.

I. Inserts and Shields:
1. Application: Piping 1-1/2 inches (40 mm) diameter or larger.
2. Shields: Galvanized steel between pipe hangers or pipe hanger rolls and inserts.
3. Insert Location: Between support shield and piping and under the finish jacket.
4. Insert Configuration: Minimum 6 inches (150 mm) long, of same thickness and contour as adjoining insulation; may be factory fabricated.

J. Continue insulation through walls, sleeves, pipe hangers, and other pipe penetrations. Finish at supports, protrusions, and interruptions. At fire separations, see Section 07 8400.

K. Pipe Exposed in Mechanical Equipment Rooms or Finished Spaces (less than 10 feet (3 meters) above finished floor): Finish with PVC jacket and fitting covers.

3.03 SCHEDULES

A. Plumbing Systems:
1. Domestic Hot Water Supply:
a. Glass Fiber, Rigid, Insulation:
1) Pipe Size Range: [Under 1-1/2] inch ([____] mm).
2) Thickness: 1 inch ([____] mm).
3) Pipe Size Range: [1-1/2 inch and over] ([____] mm).
4) Thickness: [1-1/2] inch ([____] mm).
2. Domestic Hot Water Recirculation:
a. Glass Fiber Insulation:
1) Pipe Size Range: All sizes.
2) Thickness: 1 inch (25 mm).
3. Domestic Hot Water Recirculation:
a. Glass Fiber, Rigid, Insulation
1) Pipe Size Range: [Under 1 inch] ([____] mm).
2) Thickness: [1/2] inch ([____] mm).
3) Pipe Size Range: [Over 1 inch] ([____] mm).
4) Thickness: 1 inch ([____] mm).

END OF SECTION

SECTION 22 1005
PLUMBING PIPING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Sanitary waste piping, buried within 5 feet (1500 mm) of building.
B. Sanitary waste piping, above grade.
C. Pipe flanges, unions, and couplings.
D. Gate valves.
E. Ball valves.
F. Pressure relief valves.
G. Strainers.

1.02 RELATED REQUIREMENTS

A. Section 22 0553 - IDENTIFICATION FOR PLUMBING PIPING AND EQUIPMENT.
B. Section 31 2316 - Excavation.
C. Section 31 2323 - Fill.

1.03 REFERENCE STANDARDS

A. ANSI Z21.22 - American National Standard for Relief Valves for Hot Water Supply Systems 2015 (Reaffirmed 2020).
B. ASME B16.18 - Cast Copper Alloy Solder Joint Pressure Fittings 2021.
C. ASME B16.22 - Wrought Copper and Copper Alloy Solder-Joint Pressure Fittings 2021.
D. ASME B31.9 - Building Services Piping 2020.
E. ASME BPVC-IV - Boiler and Pressure Vessel Code, Section IV - Rules for Construction of Heating Boilers 2021.
F. ASME BPVC-IX - Boiler and Pressure Vessel Code, Section IX - Qualification Standard for Welding, Brazing, and Fusing Procedures; Welders; Brazers; and Welding, Brazing, and Fusing Operators 2021.
G. ASSE 1003 - Performance Requirements for Water Pressure Reducing Valves for Potable Water Distribution Systems 2020.
H. ASTM B3 - Standard Specification for Soft or Annealed Copper Wire 2013 (Reapproved 2018).
I. ASTM B32 - Standard Specification for Solder Metal 2020.
J. ASTM B42 - Standard Specification for Seamless Copper Pipe, Standard Sizes 2020.
K. ASTM B88 - Standard Specification for Seamless Copper Water Tube 2020.
L. ASTM B813 - Standard Specification for Liquid and Paste Fluxes for Soldering of Copper and Copper Alloy Tube 2016.
M. ASTM B828 - Standard Practice for Making Capillary Joints by Soldering of Copper and Copper Alloy Tube and Fittings 2016.
N. ASTM C1277 - Standard Specification for Shielded Couplings Joining Hubless Cast Iron Soil Pipe and Fittings 2020.
O. ASTM D1785 - Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120 2021a.
P. ASTM D2235 - Standard Specification for Solvent Cement for Acrylonitrile-Butadiene-Styrene (ABS) Plastic Pipe and Fittings 2021.
Q. ASTM D2321 - Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications 2020.
R. ASTM D2564 - Standard Specification for Solvent Cements for Poly(Vinyl Chloride) (PVC) Plastic Piping Systems 2020.
S. ASTM D2661 - Standard Specification for Acrylonitrile-Butadiene-Styrene (ABS) Schedule 40 Plastic Drain, Waste, and Vent Pipe and Fittings 2021.

T. ASTM D2665 - Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Drain, Waste, and Vent Pipe and Fittings 2020.
U. ASTM D2680 - Standard Specification for Acrylonitrile-Butadiene-Styrene (ABS) and Poly(Vinyl Chloride) (PVC) Composite Sewer Piping 2020.
V. ASTM D2855 - Standard Practice for the Two-Step (Primer and Solvent Cement) Method of Joining Poly (Vinyl Chloride) (PVC) or Chlorinated Poly (Vinyl Chloride) (CPVC) Pipe and Piping Components with Tapered Sockets 2020.
W. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2022.
X. ASTM F477 - Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe 2014 (Reapproved 2021).
Y. ASTM F876 - Standard Specification for Crosslinked Polyethylene (PEX) Tubing 2022a, with Editorial Revision.
Z. ASTM F877 - Standard Specification for Crosslinked Polyethylene (PEX) Hot- and Cold-Water Distribution Systems 2022.
AA. ASTM F891 - Standard Specification for Coextruded Poly(Vinyl Chloride) (PVC) Plastic Pipe With a Cellular Core Current Edition, Including All Revisions.
BB. AWWA C651 - Disinfecting Water Mains 2014, with Addendum (2020).
CC. CISPI 301 - Standard Specification for Hubless Cast Iron Soil Pipe and Fittings for Sanitary and Storm Drain, Waste, and Vent Piping Applications 2021.
DD. CISPI 310 - Specification for Coupling for Use in Connection with Hubless Cast Iron Soil Pipe and Fittings for Sanitary and Storm Drain, Waste, and Vent Piping Applications 2018.
EE. MSS SP-71 - Gray Iron Swing Check Valves, Flanged and Threaded Ends 2018.
FF. MSS SP-80 - Bronze Gate, Globe, Angle, and Check Valves 2019.
GG. MSS SP-110 - Ball Valves Threaded, Socket-Welding, Solder Joint, Grooved and Flared Ends 2010, with Errata .
HH. NSF 61 - Drinking Water System Components - Health Effects 2021.
II. NSF 372 - Drinking Water System Components - Lead Content 2022.
JJ. UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials Current Edition, Including All Revisions.

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements for submittal procedures.
B. Product Data: Provide data on pipe materials, pipe fittings, valves, and accessories. Provide manufacturers catalog information. Indicate valve data and ratings.

1.05 QUALITY ASSURANCE

A. Perform work in accordance with all applicable local codes and standards.
B. Valves: Manufacturer's name and pressure rating marked on valve body.
C. Welding Materials and Procedures: Comply with ASME BPVC-IX and applicable state labor regulations.
D. Identify pipe with marking including size, ASTM material classification, ASTM specification, potable water certification, water pressure rating.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Accept valves on site in shipping containers with labeling in place. Inspect for damage.
B. Provide temporary protective coating on cast iron and steel valves.
C. Provide temporary end caps and closures on piping and fittings. Maintain in place until installation.
D. Protect piping systems from entry of foreign materials by temporary covers, completing sections of the work, and isolating parts of completed system. Store pipe on sleepers, a minimum of 4 inches above surrounding grade, at all times.

PART 2 PRODUCTS

2.01 GENERAL REQUIREMENTS

A. Potable Water Supply Systems: Provide piping, pipe fittings, and solder and flux (if used), that comply with NSF 61 and NSF 372 for maximum lead content; label pipe and fittings.
B. Plenum-Installed Acid Waste Piping: Flame-spread index equal or below 25 and smoke-spread index equal or below 50 according to ASTM E84 or UL 723 tests.

2.02 SANITARY WASTE PIPING, BURIED WITHIN 5 FEET (1500 MM) OF BUILDING

A. Cast Iron Pipe: CISPI 301, hubless.
   1. Fittings: Cast iron.
   2. Joints: CISPI 310, neoprene gasket and stainless steel clamp and shield assemblies. Mission
B. ABS Pipe: ASTM D2661 (Solid Wall)
   1. Fittings: ABS, ASTM D2661
   2. Joints: Solvent welded with ASTM D2235 cement.
C. PVC Pipe: ASTM D2665 (Solid Wall)
   1. Fittings: PVC, ASTM D2665
   2. Joints: Solvent welded, with ASTM D2564 solvent cement.

2.03 SANITARY WASTE PIPING, ABOVE GRADE

A. Cast Iron Pipe: CISPI 301, hubless, service weight.
   1. Fittings: Cast iron.
   2. Joints: CISPI 310, ASTM C1277, neoprene gaskets and stainless steel clamp-and-shield assemblies.
B. ABS Pipe: ASTM D2661; ASTM F628 (Foam Core)
   1. Fittings: ABS, ASTM D2661
   2. Joints: Solvent welded with ASTM D2235 cement.
C. PVC Pipe: ASTM D2665 (Solid Wall); ASTM F891 (Foam Core)
   1. Fittings: PVC, ASTM D2665
   2. Joints: Solvent welded, with ASTM D2564 solvent cement.

2.04 DOMESTIC WATER PIPING, BURIED WITHIN 5 FEET (1500 MM) OF BUILDING

A. Copper Pipe: ASTM B88, Type K, annealed.
   1. Fittings: ASME B16.18, cast copper alloy or ASME B16.22 wrought copper and bronze.
   2. Joints: AWS A5.8M/A5.8, BCuP silver braze.

2.05 DOMESTIC WATER PIPING, ABOVE GRADE

A. Copper Tube: ASTM B88 (ASTM B88M), Type L (B), Drawn (H).
   1. Fittings: ASME B16.18, cast copper alloy or ASME B16.22, wrought copper and bronze.
   2. Joints: ASTM B32, alloy Sn95 solder.

2.06 PIPE FLANGES, UNIONS, AND COUPLINGS

A. Unions for Pipe Sizes 3 inch (80 mm, DN) and Under:
   1. Ferrous Pipe: Class 150 malleable iron threaded unions.
   2. Copper Tube and Pipe: Class 150 bronze unions with soldered joints.
B. Flanges for Pipe Sizes Over 1 inch (25 mm, DN):
   1. Ferrous Pipe: Class 150 malleable iron threaded or forged steel slip-on flanges; preformed neoprene gaskets.
   2. Copper Tube and Pipe: Class 150 slip-on bronze flanges; preformed neoprene gaskets.
C. Dielectric Connections: Union with galvanized or plated steel threaded end, copper solder end, water impervious isolation barrier.

2.07 GATE VALVES

A. Manufacturers:
   1. Hammond Valve Co.; Model IB640 or IB641: www.hammondvalve.com.

2. Nibco, Inc; Model T/S-111-LF: www.nibco.com/#sle.
3. Milwaukee Valve Company; Model 148 or 1150: www.milwaukeevalve.com.
4. Stockham; Model B-100 or B-122: www.stockham.com
5. Apollo Valves; Model101SLF or 101TLF: www.apollovalves.com/#sle.
6. Substitutions: See Section 01 6000 - Product Requirements.

B. Up to and including 3-inches:
1. MSS SP-13, 300 psi, lead free, bronze body and trim, rising stem, handwheel, inside screw, solid wedge disc, solder or threaded ends.

2.08 BALL VALVES

A. Manufacturers:
1. Hammond Valve Co.; Model 8501 or 8901: www.hammondvalve.com.
2. Nibco, Inc; Model T/S-FP-600A or T/S-585-80-LF: www.nibco.com/#sle.
3. Watts; Model FBV-1 or B-6000: www.watts.com.
4. Stockham; Model S216-BR-R-T : www.stockham.com
5. Apollo Valves; Model 77CLF: www.apollovalves.com/#sle.
6. Milwaukee Valve Company; Model BA-125 or BA-100 : www.milwaukeevalve.com.
7. Substitutions: See Section 01 6000 - Product Requirements.

B. Construction, 4 inch (100 mm, DN) and Smaller: MSS SP-110, Class 150, 400 psi (2760 kPa) CWP, bronze or ductile iron body, 304 stainless steel or chrome plated brass ball, regular port, teflon seats and stuffing box ring, blow-out proof stem, lever handle with balancing stops, threaded or grooved ends with union.

C. Up to and including 3-inches:
1. MSS SP-110, 600 psi CWP, bronze, two-piece body, lead free brass ball, full port, teflon seats and stufing box ring, blow-out proof stem, lever handle solder or threaded ends.

2.09 PRESSURE RELIEF VALVES

A. Manufacturers:
1. Watts Regulator Company: www.wattsregulator.com/#sle.
2. Cash-Acme: www.cashacme.com.
3. Zurn/Wilkins: www.zurn.com.
4. Apollo Valves: www.apollovalves.com.
5. Substitutions: See Section 01 6000 - Product Requirements.

B. ANSI Z21.22, AGA certified, bronze body, teflon seat, steel stem and springs, automatic, direct pressure actuated.

2.10 STRAINERS

A. Manufacturers:
1. Watts Regulator Company: www.wattsregulator.com.
2. Hammond Valve: www.hammondvalve.com.
3. Milwaukee Valve Company: www.milwaukeevalve.com.
4. Apollo Valves: www.apollowalves.com.
5. Stockham: www.stockham.com.
6. Substitutions: See Section 01 6000 - Product Requirements.

B. Size 2 inch (50 mm, DN) and Smaller:
1. Threaded brass body for 175 psi (1200 kPa) CWP, Y pattern with 1/32 inch (0.8 mm) stainless steel perforated screen.
2. Class 150, threaded bronze body 300 psi (2070 kPa) CWP, Y pattern with 1/32 inch (0.8 mm) stainless steel perforated screen.

C. Size 1-1/2 inch (40 mm, DN) to 4 inch (100 mm, DN):
1. Class 125, flanged iron body, Y pattern with 1/16 inch (1.6 mm) stainless steel perforated screen.

D. Size 5 inch (125 mm, DN) and Larger:
   1. Class 125, flanged iron body, basket pattern with 1/8 inch (3.2 mm) stainless steel perforated screen.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that excavations are to required grade, dry, and not over-excavated.

3.02 PREPARATION

A. Ream pipe and tube ends. Remove burrs. Bevel plain end ferrous pipe.
B. Remove scale and dirt, on inside and outside, before assembly.
C. Prepare piping connections to equipment with flanges or unions.

3.03 INSTALLATION

A. Install in accordance with manufacturer's instructions.
B. Provide non-conducting dielectric connections wherever jointing dissimilar metals.
C. Route piping in orderly manner and maintain gradient. Route parallel and perpendicular to walls.
D. Install piping to maintain headroom, conserve space, and not interfere with use of space.
E. Group piping whenever practical at common elevations.
F. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment. See Section 22 0516.
G. Provide clearance in hangers and from structure and other equipment for installation of insulation and access to valves and fittings.
H. Provide access where valves and fittings are not exposed.
I. Establish elevations of buried piping outside the building to ensure not less than 2 ft ([_____] m) of cover.
J. Install vent piping penetrating roofed areas to maintain integrity of roof assembly.
K. Prepare exposed, unfinished pipe, fittings, supports, and accessories for finish painting.
L. Excavate in accordance with specfications.
M. Backfill in accordance with specifications.
N. Bury PVC and ABP pipe per ASTM D2321.
O. Install valves with stems upright or horizontal, not inverted.
P. Install water piping to ASME B31.9.
Q. Copper Pipe and Tube: Make soldered joints in accordance with ASTM B828, using specified solder, and flux meeting ASTM B813; in potable water systems use flux also complying with NSF 61 and NSF 372.
R. PVC Pipe: Make solvent-welded joints in accordance with ASTM D2855.
S. Sleeve pipes passing through partitions, walls, and floors.
T. Pipe Hangers and Supports:
   1. Install in accordance with ASME B31.9.
   2. Support horizontal piping as indicated.
   3. Install hangers to provide minimum 1/2 inch (15 mm) space between finished covering and adjacent work.
   4. Place hangers within 12 inches (300 mm) of each horizontal elbow.
   5. Use hangers with 1-1/2 inch (40 mm) minimum vertical adjustment. Design hangers for pipe movement without disengagement of supported pipe.
   6. Support vertical piping at every other floor. Support riser piping independently of connected horizontal piping.
   7. Where several pipes can be installed in parallel and at same elevation, provide multiple or trapeze hangers.

8. Provide copper plated hangers and supports for copper piping or sheet lead packing between hanger or support and piping.
9. Provide hangers adjacent to motor-driven equipment with vibration isolation; see Section 22 0548.
10. Support cast iron drainage piping at every joint.
11. Support of pipe tubing and equipment is to be accomplished by means of engineered products specific to each application. Makeshift field devised methods will not be allowed.

3.04 APPLICATION

A. Install unions downstream of valves and at equipment or apparatus connections.
B. Install brass male adapters each side of valves in copper piped system. Solder adapters to pipe.
C. Install gate valves for shut-off and to isolate equipment, part of systems, or vertical risers.

3.05 TOLERANCES

A. Drainage Piping: Establish invert elevations within 1/2 inch (10 mm) vertically of location indicated and slope to drain at minimum of 1/4 inch per foot (1:50) slope.
B. Water Piping: Slope at minimum of 1/32 inch per foot (1:400) and arrange to drain at low points.

3.06 DISINFECTION OF DOMESTIC WATER PIPING SYSTEM

A. Prior to starting work, verify system is complete, flushed, and clean.
B. Ensure acidity (pH) of water to be treated is between 7.4 and 7.6 by adding alkali (caustic soda or soda ash) or acid (hydrochloric).
C. Inject disinfectant, free chlorine in liquid, powder, tablet, or gas form throughout system to obtain 50 to 80 mg/L residual.
D. Bleed water from outlets to ensure distribution and test for disinfectant residual at minimum 15 percent of outlets.
E. Maintain disinfectant in system for 24 hours.
F. If final disinfectant residual tests less than 25 mg/L, repeat treatment.
G. Flush disinfectant from system until residual equal to that of incoming water or 1.0 mg/L.
H. Take samples no sooner than 24 hours after flushing, from 10 percent of outlets and from water entry, and analyze in accordance with AWWA C651.

3.07 SERVICE CONNECTIONS

A. Provide new sanitary sewer services. Before commencing work, check invert elevations required for sewer connections, confirm inverts and ensure that these can be properly connected with slope for drainage and cover to avoid freezing.
B. Provide new water service complete with sand strainer and shut-off valve.
   1. Provide 18 gauge, 0.0478-inch (1.21 mm) galvanized sheet metal sleeve around service main to 6 inch (150 mm) above floor and 6 feet (1800 mm) minimum below grade. Size for minimum of 2 inches (50 mm) of loose batt insulation stuffing.

END OF SECTION

SECTION 22 1006
PLUMBING PIPING SPECIALTIES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Drains.
B. Cleanouts.
C. Backflow preventers.
D. Double check valve assemblies.
E. Water hammer arrestors.
F. Trap primers.
G. Sanitary waste interceptors.
H. Mixing valves.

1.02 RELATED REQUIREMENTS

A. Section 22 1005 - PLUMBING PIPING.
B. Section 22 3000 - PLUMBING EQUIPMENT.
C. Section 22 4000 - PLUMBING FIXTURES.
D. Section 26 0583 - Wiring Connections: Electrical characteristics and wiring connections.

1.03 REFERENCE STANDARDS

A. 36 CFR 1191 - Americans with Disabilities Act (ADA) Accessibility Guidelines for Buildings and Facilities; Architectural Barriers Act (ABA) Accessibility Guidelines current edition.
B. ADA Standards - 2010 ADA Standards for Accessible Design 2010.
C. ASME A112.6.3 - Floor and Trench Drains 2019.
D. ASSE 1012 - Performance Requirements for Backflow Preventers with an Intermediate Atmospheric Vent 2021.
E. ASSE 1013 - Performance Requirements for Reduced Pressure Principle Backflow Prevention Assemblies 2021.
F. ASSE 1018 - Performance Requirements for Trap Seal Primer Valves - Potable Water Supplied 2001 (Reaffirmed 2021).
G. NSF 61 - Drinking Water System Components - Health Effects 2021.
H. NSF 372 - Drinking Water System Components - Lead Content 2022.
I. PDI-WH 201 - Water Hammer Arresters 2017.

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements for submittal procedures.
B. Product Data: Provide component sizes, rough-in requirements, service sizes, and finishes.
C. Certificates: Certify that grease interceptors meet or exceed specified requirements.
D. Manufacturer's Instructions: Indicate Manufacturer's Installation Instructions: Indicate assembly and support requirements.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with not less than three years documented experience.

PART 2 PRODUCTS

2.01 GENERAL REQUIREMENTS

A. Specialties in Potable Water Supply Systems: Provide products that comply with NSF 61 and NSF 372 for maximum lead content.

2.02 DRAINS

A. Floor Drain (FD-1):
   1. ASME A112.6.3; lacquered cast iron or stainless steel, two piece body with double drainage flange, weep holes, reversible clamping collar, and round, adjustable nickel-bronze strainer.

2. Manufacturers:
   a. Jay R Smith Manufacturing Company; Model 2005-A or Model 2005-B: www.jayrsmith.com.
   b. MIFAB Inc: www.mifab.com.
   c. Wade: www.wadedrains.com.
   d. Zurn Industries, Inc.: www.zurn.com.
   e. Sioux Chief Finish Line; Model 833-NR and Model 833-NQ: www.siouxchief.com
   f. Substitutions: See Section 01 6000 - Product Requirements

B. Floor Drain (FD-2):
   1. ASME A112.6.3; lacquered cast iron or stainless steel, two piece body with double drainage flange, weep holes, reversible clamping collar, and round, adjustable cast iron strainer with acid resistant coating.
   2. Manufacturers:
      a. Jay R Smith Manufacturing Company; Model 2110 or Model 2130: www.jayrsmith.com.
      b. MIFAB Inc: www.mifab.com.
      c. Wade: www.wadedrains.com.
      d. Zurn Industries, Inc.: www.zurn.com.
      e. Sioux Chief Finish Line; Model 860-i: www.siouxchief.com
      f. Substitutions: See Section 01 6000 - Product Requirements
   3. Substitutions: See Section 01 6000 - Product Requirements See Section 01 6000 - Product Requirements.

C. Floor Sink FS-1:
   1. Square lacquered cast iron body with integral seepage pan, epoxy coated interior, aluminum dome strainer, nickel bronze frame, and clamp collar. Half grate.
   2. Manufacturers:
      a. Jay R Smith Manufacturing Company: www.jayrsmith.com.
      b. MIFAB Inc: www.mifab.com.
      c. Wade: www.wadedrains.com.
      d. Zurn Industries, Inc.: www.zurn.com.
      e. Sioux Chief; Model 861-iN: www.siouxchief.com
      f. Substitutions: See Section 01 6000 - Product Requirements See Section 01 6000 - Product Requirements.

2.03 CLEANOUTS

A. Manufacturers:
   1. Jay R. Smith Manufacturing Company: www.jrsmith.com/#sle.
   2. MIFAB, Inc: www.mifab.com/#sle.
   3. Wade: www.wadedrains.com
   4. Zurn Industries, LLC: www.zurn.com/#sle.
   5. Sioux Chief Finish Line: www.siouxchief.com
   6. Substitutions: See Section 01 6000 - Product Requirements.

B. Cleanouts at Exterior Surfaced Areas (CO-1):
   1. Round cast nickel bronze access frame and non-skid cover.
   2. Manufacturers:
      a. Jay R. Smith Manufacturing Company; Model 4250: www.jrsmith.com/#sle.
      b. Sioux Chief; Model 834-DNR: www.siouxchief.com.

C. Cleanouts at Interior Finished Floor Areas (CO-2):
   1. Lacquered cast iron body with anchor flange, threaded top assembly, and round gasketed scored cover in service areas and round gasketed depressed cover to accept floor finish in finished floor areas.

D. Cleanouts at Interior Finished Wall Areas (CO-3):
   1. Line type with lacquered cast iron body and round epoxy coated gasketed cover, and round stainless steel access cover secured with machine screw.

2.04 BACKFLOW PREVENTERS

A. Manufacturers:
   1. Febco: www.febcoonline.com.
   2. Zurn Industries, LLC: www.zurn.com/#sle.
   3. Apollo Valves: www.apollovalves.com/#sle.
   4. Substitutions: See Section 01 6000 - Product Requirements.
B. Reduced Pressure Backflow Preventer Assembly:
   1. ASSE 1013; cast bronze body and stainless steel springs; two independently operating, spring loaded check valves; diaphragm type differential pressure relief valve located between check valves; third check valve that opens under back pressure in case of diaphragm failure, and non-threaded vent outlet.
   2. Size: [_____] inch ([_____] mm) assembly with two gate valves.
   3. Accessories: Provide 4 test cocks and strainer.

2.05 DOUBLE CHECK-VALVE ASSEMBLIES

A. Manufacturers:
   1. Febco: www.febcoonline.com.
   2. Zurn Industries,: www.zurn.com/#sle.
   3. Apollo Valves: www.apollovalves.com/#sle.
   4. Substitutions: See Section 01 6000 - Product Requirements.
B. Double Check Valve Assembly:
   1. ASSE 1012; cast bronze body with corrosion resistant internal parts and stainless steel springs; two independently operating check valves with intermediate atmospheric vent.

2.06 WATER HAMMER ARRESTORS

A. Manufacturers:
   1. Jay R. Smith Manufacturing Company: www.jrsmith.com/#sle.
   2. MIFAB, Inc: www.mifab.com.
   3. Zurn Industries, LLC: www.zurn.com/#sle.
   4. Precision Plumbing Products, Inc.: www.ppcinc.com.
   5. Sioux Chief: www.siouxchief.com.
   6. Substitutions: See Section 01 6000 - Product Requirements.
B. Water Hammer Arrestors:
   1. Stainless steel construction, bellows type sized in accordance with PDI-WH 201, precharged suitable for operation in temperature range minus 100 to 300 degrees F (minus 73 to 149 degrees C) and maximum 250 psi (1700 kPa) working pressure.

2.07 TRAP PRIMERS

A. Manufacturers:
   1. Precisions Products (PPP); Model PRO 01-500.
B. In-line trap primer valve, 1/2 inch, lead free brass, vacuum breaker, internal check valve, activation at minimum flow of 0.5 gpm at 20 psi, ASSE 1018.
C. Accessories: Provide distribution unit for multiple design connections.
D. Service shut-off valve.

2.08 SANITARY WASTE INTERCEPTORS

A. Grease Interceptors:
   1. Construction:
      a. Material: Seamless, rotationally molded polyethylene..
      b. Rough-in: Above grade.

c. Accessories: Multi-weir baffle assembly, integral deep seal trap, removable integral flow control, field risers, high water anchor kit.
d. Cover: Steel, epoxy coated, non-skid with gasket, securing handle, cast iron, H2O traffic rated, gas/water tight..

2. Unit Rating: As inidicated on the schedule, ASME A112.12.3.
3. Manufacturers:
   a. Schier; Model GB-[_____].
   b. Endura Interceptors; Model [_____].
   c. Substitutions: See Section 01 6000 - Product Requirements.

2.09 MIXING VALVES

A. Thermostatic Mixing Valves:
   1. Manufacturers:
      a. Powers: www.powerscontrols.com.
      b. Leonard Valve Company: www.leonardvalve.com/#sle.
      c. Symmons Industries, Inc.: www.symmons.com.
      d. Substitutions: See Section 01 6000 - Product Requirements.
   2. Valve: Chrome-plated cast brass body, stainless steel or copper alloy bellows, integral temperature adjustment.
   3. Capacity: [_____] gpm ([_____] L/s) at [_____] psi ([_____] kPa) differential.
   4. Accessories:
      a. Check valve on inlets.
      b. Volume control shut-off valve on outlet.
      c. Stem thermometer on outlet.
      d. Strainer stop checks on inlets.
   5. Cabinet: 16 gauge, 0.0598 inch (1.52 mm) enameled steel, for surface mounting with keyed lock.

B. Pressure Balanced Mixing Valves:
   1. Manufacturers:
      a. Powers: www.powerscontrols.com.
      b. Leonard Valve Company: www.leonardvalve.com.
      c. Symmons Industries, Inc.: www.symmons.com.
      d. Substitutions: See Section 01 6000 - Product Requirements.
   2. Valve: Chrome-plated cast brass body, stainless steel cylinder, integral temperature adjustment.
      a. Capacity: [_____] gpm ([_____] L/s) at [_____] psi ([_____] kPa) differential.
   3. Accessories:
      a. Volume control shut-off valve on outlet.
      b. Stem thermometer on outlet.
      c. Strainer stop checks on inlets.
      d. Cabinet: 16 gauge, 0.0598 inch (1.52 mm) enameled steel, for surface mounting with keyed lock.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install in accordance with manufacturer's instructions.
B. Extend cleanouts to finished floor or wall surface. Lubricate threaded cleanout plugs with mixture of graphite and linseed oil. Ensure clearance at cleanout for rodding of drainage system.
C. Encase exterior cleanouts in concrete flush with grade.
D. Install floor cleanouts at elevation to accommodate finished floor.

E. Install approved potable water protection devices on plumbing lines where contamination of domestic water may occur; on boiler feed water lines, janitor rooms, fire sprinkler systems, premise isolation, irrigation systems, flush valves, interior and exterior hose bibbs.
F. Pipe relief from backflow preventer to nearest drain.
G. Install water hammer arrestors complete with accessible isolation valve on hot and cold water supply piping to lavatory sinks, washing machine outlets, or [_____].
H. Install air chambers on hot and cold water supply piping to each fixture or group of fixtures (each washroom). Fabricate same size as supply pipe or 3/4 inch (20 mm) minimum, and minimum 18 inches (450 mm) long.
I. Install service shut-ff valve for trap primers.

END OF SECTION

SECTION 22 3000
PLUMBING EQUIPMENT

PART 1 GENERAL

1.01 SECTION INCLUDES

A. High efficiency gas fired water heaters.
B. Diaphragm-type compression tanks.
C. Acid-effluent neutralizers.

1.02 RELATED REQUIREMENTS

A. Section 26 0583 - Wiring Connections: Electrical characteristics and wiring connections.

1.03 REFERENCE STANDARDS

A. AHRI Directory of Certified Product Performance - Air-Conditioning, Heating, and Refrigeration Institute (AHRI) Current Edition.
B. ANSI Z21.10.3 - Gas-Fired Water Heaters, Volume III, Storage Water Heaters with Input Ratings Above 75,000 Btu Per Hour, Circulating and Instantaneous 2019.
C. ASHRAE Std 90.1 I-P - Energy Standard for Buildings Except Low-Rise Residential Buildings Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
D. ASME BPVC-VIII-1 - Boiler and Pressure Vessel Code, Section VIII, Division 1: Rules for Construction of Pressure Vessels 2021.
E. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum) 2020.

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements for submittals procedures.
B. Product Data:
   1. Provide dimension drawings of water heaters indicating components and connections to other equipment and piping.
   2. Indicate type, capacity, power requirements.
   3. Provide electrical characteristics and connection requirements.
C. Operation and Maintenance Data: Include operation, maintenance, and inspection data, replacement part numbers and availability, and service depot location and telephone number.
D. Warranty Documentation: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.
B. Certifications:
   1. Water Heaters: NSF approved.
   2. Gas Water Heaters: Certified by CSA International to 1 or 2, as applicable, in addition to requirements specified elsewhere..
   3. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc., as suitable for the purpose specified and indicated.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Provide temporary inlet and outlet caps. Maintain caps in place until installation.

1.07 WARRANTY

A. See Section 01 7800 - Closeout Submittals for additional warranty requirements.
B. Provide five year manufacturer warranty for domestic water heaters.

PART 2 PRODUCTS

2.01 HIGH EFFICIENCY GAS FIRED WATER HEATER

A. Manufacturers:
   1. A.O. Smith Water Products Co; Model Cyclone Xi: www.hotwater.com

2. Bradford-White; Model EF: "eForce": www.bradfordwhite.com.
3. State Industries; Model Ultra Force: www.statewaterheaters.com.
4. Substitutions: See Section 01 60 00 - Product Requirements.

B. Type: Automatic, natural gas-fired, vertical storage.

C. Capacity:
1. As indicated on the Drawing schedules.
2. Certification: ANSI Z21.10.3.

D. Tank: Glass lined welded steel; multiple flue passages, 4 inch diameter inspection port, thermally insulated with minimum 3 inches foam, encased in corrosion-resistant steel jacket; baked-on enamel finish; floor shield and legs.

E. Accessories: Provide NSF approved stand for kitchen applications and the following:
1. Water Connections: Brass.
2. Dip tube: Brass
3. Drain valve.
4. Anode: Magnesium.
5. Temperature and Pressure Relief Valve: ASME labelled.

F. Approval: By AGA as automatic storage water heater and for operation at 180 degrees F.

G. Controls: Automatic water thermostat with temperature range adjustable from 120 to 180 degrees F. Automatic reset high temperature limiting thermostat factory set at 140 degrees F, gas pressure regulator, turbulent jet sealed combustion burner with direct venting with Prolypropelene piping, electronic ignition, 100 percent safety shut-off pilot and thermocouple, automatic flue damper and draft hood

2.02 DIAPHRAGM-TYPE COMPRESSION TANKS

A. Manufacturers:
1. Amtrol Inc; Model ST-C: www.amtrol.com/#sle.
2. Bell & Gossett, a brand of Xylem, Inc; PTA: www.bellgossett.com/#sle.
3. Taco, Inc: www.taco-hvac.com/#sle.
4. Substitutions: See Section 01 6000 - Product Requirements.

B. Construction: Welded steel, tested and stamped in accordance with ASME BPVC-VIII-1; supplied with National Board Form U-1, rated for working pressure of 125 psig (860 kPa), with flexible EPDM diaphragm sealed into tank, and steel legs or saddles.

C. Accessories: Pressure gauge and air-charging fitting, tank drain; precharge as indicated on the drawings.

2.03 ACID-EFFLUENT NEUTRALIZERS

A. Manufacturers:
1. Aquapure, 3M Purification, Inc: www.aquapure.com/#sle.
2. Viqua, a division of Trojan Technologies ULC: www.viqua.com/#sle.
3. Substitutions: See Section 01 6000 - Product Requirements.

B. Performance:
1. Maximum Low pH Water Flow Rate: Per water heater condensate capacity.
2. Media consists of calcite, limestone, or [_____] mineral media.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install plumbing equipment in accordance with manufacturer's instructions, as required by code, and complying with conditions of certification, if any.

B. Coordinate with plumbing piping and related fuel piping work to achieve operating system.

C. Domestic Water Storage Tanks:
1. Provide steel pipe support, independent of building structural framing members.

2. Clean and flush prior to delivery to site. Seal until pipe connections are made.

END OF SECTION

SECTION 22 4000
PLUMBING FIXTURES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Sinks.
B. Service sinks.

1.02 RELATED REQUIREMENTS

A. Section 07 9200 - Joint Sealants: Sealing joints between fixtures and walls and floors.
B. Section 11 4000 - Foodservice Equipment: Food service sinks.
C. Section 22 1005 - PLUMBING PIPING.
D. Section 22 1006 - PLUMBING PIPING SPECIALTIES.
E. Section 22 3000 - PLUMBING EQUIPMENT.
F. Section 26 0583 - Wiring Connections: Electrical characteristics and wiring connections.

1.03 REFERENCE STANDARDS

A. ADA Standards - 2010 ADA Standards for Accessible Design 2010.
B. ASME A112.18.1 - Plumbing Supply Fittings 2018, with Errata.
C. NSF 61 - Drinking Water System Components - Health Effects 2021.
D. NSF 372 - Drinking Water System Components - Lead Content 2022.

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements for submittal procedures.
B. Product Data: Provide catalog illustrations of fixtures, sizes, rough-in dimensions, utility sizes, trim, and finishes.
C. Manufacturer's Instructions: Indicate installation methods and procedures.
D. Maintenance Data: Include fixture trim exploded view and replacement parts lists.

1.05 QUALITY ASSURANCE

A. Perform work in accordance with applicable codes.
B. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.

1.06 REGULATORY REQUIREMENTS

A. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc., as suitable for the purpose specified and indicated.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Section 01 6 - Product Requirements: Product storage and handling requirements.

1.08 WARRANTY

A. See Section 01 7800 - Closeout Submittals for additional warranty requirements.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that walls and floor finishes are prepared and ready for installation of fixtures.
B. Confirm that millwork is constructed with adequate provision for the installation of counter top lavatories and sinks.

3.02 PREPARATION

A. Rough-in fixture piping connections in accordance with minimum sizes indicated in fixture rough-in schedule for particular fixtures.

3.03 INSTALLATION

A. Install work in accordance with applicable codes.
B. Install each fixture with trap, easily removable for servicing and cleaning.
C. Provide chrome-plated rigid or flexible supplies to fixtures with handle stops, reducers, and escutcheons.

D. Install components level and plumb.
E. Install and secure fixtures in place with wall supports and bolts.
F. Seal fixtures to wall and floor surfaces with sealant as specified in Section 07 90 05, color to match fixture.

3.04 INTERFACE WITH WORK OF OTHER SECTIONS

A. Review millwork shop drawings. Confirm location and size of fixtures and openings before rough-in and installation.
B. Review food service drawings. Provide fixture water and drain connections.

3.05 ADJUSTING

A. Section 01 7000 - Execution Requirements: Testing, adjusting, and balancing.
B. Adjust stops or valves for intended water flow rate to fixtures without splashing, noise, or overflow.

3.06 PROTECTION

A. Protect installed products from damage due to subsequent construction operations.
B. Do not permit use of fixtures by construction personnel.
C. Repair or replace damaged products before Date of Substantial Completion.

END OF SECTION

SECTION 23 0000
BASIC HVAC REQUIREMENTS

PART 1 GENERAL

1.01 DESCRIPTION OF WORK

A. This Section specifies the basic requirements for all Contractor installed equipment. It applies to all sections included in Division 23. The requirements herein are an expansion upon the requirements of Division 1.
B. Provide all materials, labor and equipment required to install complete and fully operational HVAC systems as indicated by the contract drawings and this specification.
C. Obtain and pay for all permits, licenses, fees and taxes applicable to this project as required by law.
D. Cooperate with other trades in furnishing material and information required for installation and operation of mechanical items.
E. Requirements for the following are included:
    1. Related work (other Contract Documents and specification sections) that must be combined with the requirements of this Section.
    2. Design performance.
    3. Delivery, storage, and handling.
    4. Quality assurance and standards.
    5. Submittals.
    6. Product quality, basic type, and finishes.
    7. Equipment identification.
    8. Design criteria.
    9. Installation.
    10. Mounting and shimming.
    11. Inspection.
    12. Safety considerations.
    13. Cleaning, startup, and adjustments.

1.02 RELATED WORK

A. This general section shall be used in conjunction with the following other specifications and related Contract Documents to establish the total requirements for the project equipment and systems:
    1. Division 1 sections included in this Project specifications.
    2. The Contract.
    3. General and specific mechanical specifications and drawings included in the project.

1.03 DEFINITIONS

A. “Indicated”: Refers to graphic representations, notes or schedules in the Drawings; or to other paragraphs or schedules in Specifications and similar requirements in the Contract Documents.
    1. Terms such as “shown”, “noted”, “scheduled”, and “specified”, are used to notify or help the user to locate reference. Location is not limited.
B. “Directed”: Terms such as “directed”, Requested”, “authorized”, “selected”, “approved”, “required”, and “permitted” mean directed by Architect/Engineer, approved by Architect/Engineer and similar phrases.
C. “Approved”: When used in conjunction with Architect/Engineer's action on contract submittals, applications, requests, is limited to Architect/Engineer's duties and responsibilities as stated in the Conditions of the Contract.
D. “Regulations”: Includes laws, ordinances, statutes and lawful orders issued by authorities having jurisdiction, as well as rules, conventions and agreements within the construction

industry that control performance of Work.

E. “Furnish”: Means to supply and deliver to the Project site, ready for unloading, unpacking, assembly, installation and similar operations.

F. “Install”: Describes operations at Project site including actual unloading, temporary storage, unpacking, assembling, erecting, placing, anchoring, supporting, isolating, applying, working to dimension, finishing, curing, protecting, cleaning and similar operations.

G. “Provide”: Means to furnish and install.

H. “Installer”: A contractor, or another entity engaged by the contractor, either as an employee, subcontractor, or contractor of a lower tier, to perform a particular construction activity including installation, erection, application or similar operations.

1. Installers are required to be experienced in operations they are engaged to perform.
2. The term “experience” means having successfully completed a minimum of three previous projects similar in scope and size to this Project and within the time frame indicated in the “Quality Assurance” section of the Specifications. In addition, in means being familiar with special requirements indicated and having complied with requirements of authorities having jurisdiction.

I. “Project Site”: Is defined as the space available to the Contractor for performing construction activities, either exclusively or in conjunction with others performing other work as part of Project.

1.04 DESIGN PERFORMANCE

A. Compliance by the Contractor and/or Vendor with the provisions of this Specification does not relieve him of the responsibilities of furnishing equipment and materials of proper design, mechanically suited to meet operating guarantees at the specified service conditions.

1.05 SUBMITTALS

A. Product Data: Submit complete sets of manufacturer's product data in .PDF format for approval. All submittals are to be received in no more than (3) three packages. See Division 1 for further information regarding submittal requirements. Literature submitted shall clearly indicate the model number, capacity, rated operating conditions, noise levels, size, weight, support requirements, rough-in data and dimensions, electrical power requirements, wiring diagrams, utility (fuel, air, cooling water, etc.) requirements, and options furnished. Submittals shall include, but are not necessarily limited to the following;

1. HVAC: Boilers; chillers; pumps; air handling units; cooling towers; fans; piping; valves; supports and anchors; louvers; grilles; diffusers; controls and the like.

B. Operation and Maintenance Data: Submit three complete sets of manufacturer's literature bound in a three ring binder for approval. Data shall include installation, start-up, and maintenance instructions, parts lists, and wiring diagrams. Include all material on a CD-ROM or USB device.

C. Substitutions: System design was based upon the equipment and materials listed on the drawings and specifications herein. At contractor's option, another manufacturer's equipment of similar quality, capacity and features may be submitted for prior approval per Section 01 6000.

1. Prior permission to substitute does not relieve the contractor of the responsibility of including this information in the bound submittal packages.

D. Air Balancing Report: Provide .PDF reports stating the design air and hydronic flow requirements per, air inlet and air outlet and the final adjusted airflow volume for the same.

1.06 QUALITY ASSURANCE

A. Codes and Standards: Comply with the provisions of the following codes, standards and specifications, except where more stringent requirements are shown or specified:

1. State of Washington "IBC".

2. State of Washington "IMC".
3. State of Washington "UPC".
4. State of Washington "IFC".
5. ANSI/ASHRAE 90 - “Energy Efficient Design of New Buildings….”
6. ANSI/ASHRAE 62 - “Ventilation for Acceptable Indoor Air Quality.”
7. NEBB - “Procedural Standard for Testing, Adjusting and Balancing of Environmental Systems.”
8. ANSI B31.9 "Building Service Piping".
9. SMACNA - "HVAC Duct Construction Standards".
10. NFPA - Section 90B.

B. Wherever the specification call for or describe materials or construction of better quality or larger sizes than are required by the above rules and regulations, these specifications shall govern. Should there be any direct conflict between the above rules and regulations and the specifications the rules shall govern.

C. Drawings: All drawings are diagrammatic and show general design, arrangement, and extent of the systems. Do not scale drawings for rough-in dimensions, nor use as shop drawings.

D. Installer Qualifications: Company specializing in performing the work required with a minimum of five years documented experience.

E. Contractor shall furnish and install all work in accordance with manufacturers' recommendations and instructions.

F. Equipment shall have U.L. label listing.

1.07 MATERIALS AND SUBSTITUTIONS

A. Shop drawings of proposed material and equipment that differ from the specified basis of design materials and equipment shall be accompanied by shop drawings that define changes physical layout and performance. These drawings shall show modifications of architectural, plumbing, electrical and mechanical work required by the proposed materials and equipment such as relocation of flues, drains, piping, ducts, revised electrical circuits, relocation of roof or wall penetrations, revised foundations and the like.

1.08 DELIVERY, STORAGE AND PROTECTION

A. Delivery: Deliver to site with manufacturer's labels intact and legible.

B. Preparation for shipment:
1. Each unit shall be suitably prepared for the shipment specified and for storage in accordance with manufacturer's instructions in a manner requiring no disassembly prior to operation.
2. The Contractor shall be solely responsible for the adequacy of the Preparation for Shipment provisions employed with respect to materials and application.
3. One complete set of Installations, Operating and Maintenance Instructions shall be packed and shipped with the equipment. This set is in addition to the sets that are to be sent directly to the Owner.

C. Handling: Avoid damage. Comply with manufacturer's installation instruction requirements for rigging, unloading and transporting units.

D. Storage: Inside protected from weather, dirt and construction dust. Where necessary to store outside, elevate well above grade and enclose with durable, waterproof wrapping. Cap all pipe ends. Taping pipe ends is not adequate or allowable.

1.09 PROJECT CONDITIONS

A. General: Provide products which are compatible with other portions of the work and provide products with the proper power characteristics and similar adaptations for the project.

B. Arrangement: Arrange ductwork and piping parallel with primary lines of the building construction and with a minimum 7 feet overhead clearance in unfinished equipment rooms

where possible. Conceal all piping and ductwork where possible unless indicated otherwise. Locate operating and control equipment properly to provide easy access for operation and maintenance. Give right-of-way to piping which must be sloped for drainage. Set all equipment level or as recommended by manufacturer.

C. Coordination: Where several elements of the work must be sequenced and positioned in order to fit the available space, prepare shop drawings showing the actual physical dimensions (at accurate scale) required for installation and submit prior to purchase/fabrication/installation of any of the elements involved in the coordination.

1.10 STANDARDS

A. General: Provide all new materials and equipment, identical to apparatus or equipment in successful operation for a minimum of five years. Provide materials of comparable quality omitted here but necessary to complete the work. Maximum allowable variation from stated capacities, minus 5% to plus 10% as approved in each case.

B. Governing Standards: The following are typical standards generally referenced in these specifications and identified by their acronym. Federal Specifications (FS), American Society for Testing Materials (ASTM), American National Standards Institute (ANSI), Manufacturer's Standardization Society of the Valve and Fitting Industry, Standard Practice (MSS SP-69), Cast Iron Soil Pipe Institute (CISPI), Underwriters Laboratory (UL) numbers are given.

C. Wherever the specifications call for or describe materials or construction of better quality or larger sizes than are required by the above standards or code, these specifications shall govern. For any direct conflict between the specifications and the above standards or codes, the standards and codes shall govern.

1.11 WARRANTIES

A. Comply with Division 01 section - Project Closeout.

B. Equipment under this section of the specifications shall be guaranteed for a period of one year from date of acceptance against defective materials, design, and workmanship.

C. Contractor shall leave entire installation in complete working order and free from defects in material, workmanship, or finish.

D. The HVAC contractor, by accepting these specifications and by signing the sub-contract, shall guarantee the following:

1. All equipment, material, and workmanship against defects in material and workmanship for a period of one (1) year from date of final acceptance by the Owner. The HVAC contractor shall furnish written guarantee to replace defective work and materials furnished under this section, at no cost to the Owner, for this one (1) year period.
2. That equipment and material will produce the results specified.

E. The Owner reserves the right to make temporary repairs as necessary to keep equipment in operating condition without voiding the guarantees or relieving responsibility during the guarantee period.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 LAYOUT AND COORDINATION

A. Site Examination: Before starting work, carefully examine site and all Contract Drawings. Become thoroughly familiar with conditions governing work on this project. Verify all indicated elevations, building measurements, rough-in dimensions and equipment locations before proceeding with any work.

B. Utility Locations: The location of all utilities, wires, conduits, pipes, ducts, or other service facilities are shown in a general way only on the drawings and in some instances are taken from existing drawings. Ascertain whether any additional facilities other than those shown on the plans may be present and determine the exact location and elevations of all utilities prior to

commencing installation.

C. The inclusion and proper location of supports, pads, sleepers, openings, anchoring and the like provided by others is the responsibility of the contractor under this section. Cutting and/or boring shall be permitted under this section only with the written approval or the Architect.
D. It shall be the contractor's responsibility to coordinate and have provided by other trades where not covered by the Contractor's work scope of work all electrical wiring and power to equipment, controls and devices, all plumbing and any other work from other trades as required to provide fully functional HVAC systems per contract documents.
E. Discrepancies: Any error, omission, conflict or discrepancy in Drawings, Specifications and/or existing conditions shall be reported immediately. Do not proceed with any questionable items of work until clarification of same has been made. Should rearrangement or re-routing of piping or ductwork be necessary, provide for approval the simplest layout possible for that particular portion of the work. Under no circumstances shall beams, girders, footings or columns be cut for mechanical items. Casting of pipes into concrete is prohibited unless so shown on Drawings.
F. The Contractor shall cooperate with others to avoid interferences and delays in the construction work.
G. Interference as a result of poor coordination or lack of cooperation with other trades shall be corrected at the Contractor's expense.

3.02 CONTINUITY OF EXISTING SERVICES

A. Existing water, power, heat, ventilation, air conditioning and other services shall remain in service during new construction work. Coordinate any interruption in service during new construction work. Coordinate any interruption of these services with the Owner's representative a minimum of twenty-four (24) hours in advance.
B. Protect from damage active utilities existing and evident by reasonable inspection of the site whether shown or not on the Drawings. Protect, relocate or abandon utilities encountered in the work which were not shown on the Drawings or evident by inspection of the work as directed by the Architect. Maintain continuity of all utility services to existing buildings.

3.03 CUTTING AND PATCHING

A. General: Perform cutting and patching in accordance with Division 1.
B. Protection: During cutting and patching, protect adjacent installations. Provide temporary barriers to prevent the spread of dust and dirt outside of the immediate work area.
C. Repair: Patch finished surfaces and building components using new materials to match the existing.
D. Inspection: Upon written direction from the Architect, uncover and restore work to provide for observation of concealed work.

3.04 EQUIPMENT REMOVAL

A. All removed equipment is the property of the Contractor unless indicated otherwise. Disconnect and remove all such equipment from the property. Cap all piping in walls, below floors, and/or above ceilings in finished rooms.
B. Where equipment is to be reused, reconnect piping, wiring and/or controls to allow this equipment to function as it had prior to this renovation unless indicated otherwise.

3.05 MECHANICAL EQUIPMENT WIRING

A. Provide all motor starters, control devices, and wiring complete from power source indicated on Drawings.
B. Equipment and systems shown on the Drawings and/or specifications, are based upon requirements of specific manufacturers which are intended as somewhat typical of several makes which may be approved. Provide all field wiring and/or devices necessary for a complete and operable system controls for the actual selected equipment/system.

3.06 INSTALLATION

A. Manufacturer's directions shall be followed in cases where the manufacturers of materials and equipment used in this contract furnish directions covering points not shown in the drawings and specifications.
B. Locating and Positioning Equipment: Observe all Codes and Regulations and good common practice in locating and installing mechanical equipment and material so that completed installation presents the least possible hazard. Maintain recommended clearances for repair and service to all equipment.
C. Anchorage: Anchor and/or brace all mechanical equipment, piping and ductwork to resist displacement due to seismic action, include snubbers on equipment mounted on spring isolators.
D. Where mounting heights or locations are not identified, install systems, equipment and materials to provide maximum headroom.
E. Provide clearance for installation of insulation and access to valves, fittings, damper actuators, etc. on pipe and duct systems.
F. Install systems, materials and equipment giving right of way to systems required to be installed at a specific slope or operation by gravity.
G. Provide condensate drain piping to over nearest floor drain for all coils, furnaces, boilers, domestic water heaters and the likes.
H. Provide all sheaves required for final air balance. Contractor shall not make assumptions or exceptions concerning the number of sheave replacements or adjustments necessary to meet the design requirements. Balance all HVAC systems to provide the amount of air indicated at each diffuser, grille or register.
I. Do not operate fans for any purpose until ductwork is clean, filters in place, bearings lubricated, and the fan has been test run under observation. Fans shall not be used during construction unless specifically authorized by the Owner and reviewed by the Engineer.
J. Provide balancing dampers on duct take-off to diffusers, grilles, and registers, regardless of whether dampers are specified as part of the diffuser, grille, or register assembly.
K. Installation shall be in accordance with the requirements of the equipment manufacturer, including special requirements for seismic restraints.

3.07 MOUNTING AND SHIMMING

A. Mount equipment as shown on the Drawings. Provisions for mounting special equipment on spring isolators, snubbers, and inertia bases are specified in Section 23 05 48, Vibration Isolation and Sound and Seismic Controls for HVAC Piping and Equipment.
B. Level the equipment by means of 304 stainless steel wedges (stainless steel plates and stainless steel shims). Wedge taper shall not be greater than 1/4 inch per foot. Use double wedges to provide a level bearing surface for the equipment. Secure each pair of wedges in their final positions with one tack weld on each side after leveling is complete. Wedging shall be executed in a manner that will prevent a change in level or springing of the Baseplate when the anchor bolts are tightened.
    1. Adjust rotating equipment assemblies such that the driving units are properly aligned, plumb and level with the driven units and all interconnecting shafts and couplings.
    2. All rotating equipment shall be checked for proper alignment with dial indicators or laser after completion of grouting. The alignment must be within the tolerances required by the equipment manufacturer. The final alignment check shall be witnessed by the Owner.

3.08 INSPECTION

A. The Contractor shall inspect his work to ensure the installation and workmanship is in accordance with these specifications and acceptable industry standards for the work being done.

B. All materials, equipment, and workmanship shall be subject to inspection at any time by the Owner. Contractor shall correct any work, materials, or equipment not in accordance with the Contract Documents.
C. Any work enclosed or covered up prior to inspection and testing shall be uncovered. After the work has been tested, inspected and accepted, repair as necessary to return disturbed work to its original and proper condition at no cost to the Owner.

3.09 SAFETY CONSIDERATIONS

A. All equipment shall be installed with suitable access clearances that satisfy OSHA and code requirements for maintenance or removal of replaceable parts and components, and with necessary unions or flanges to perform the maintenance or removal without removing the connecting appurtenances.
B. Where equipment requiring periodic maintenance cannot be reached by normal walkways because of interference with ductwork, piping, or other obstructions the Contractor shall notify the Owner and propose an alternate safe means of access. These may include construction of an overhead platform with stairway or ladder ends and safety railings or handholds, or walk-through duct plenums with hinged access doors, or as required to meet OSHA standards for safe maintenance procedures.

3.10 CLEANING, START-UP, AND ADJUSTING

A. The Contractors shall be responsible for proper operation of all systems, minor subsystems, and services provided under this section. He shall coordinate start-up procedures, calibration, and system checkout with all project managers. Any system operational problems shall be diagnosed; all correctional procedures shall be initiated as required to bring out the system into compliance with the design, and the problem then shall be rechecked to verify that the system operates normally.
B. Thoroughly clean all parts of the installation at the completion of the work. The Contractor shall clean up and remove from the premises all refuse material, crates, and rubbish arising from his work. Remove, clean, and reinstall all filters. Belt-drive tensions and alignments shall be checked. All motors and bearings shall be lubricated in accordance with the manufacturer's service manuals prior to equipment start-up. Provide a lubrication schedule for every item of equipment furnished under this section. The schedule shall include the type of lubricant and the application frequency.

END OF SECTION

SECTION 23 0548
VIBRATION ISOLATION AND SEISMIC CONTROLS FOR HVAC

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Vibration isolation requirements.
B. Seismic control requirements.
   1. Includes requirements for seismic qualification of equipment not specified in this section.
C. Vibration isolators.
D. External seismic snubber assemblies.
E. Seismic restraint systems.
F. Vibration-isolated and/or seismically engineered roof curbs.

1.02 DEFINITIONS

A. HVAC Component: Where referenced in this section in regards to seismic controls, applies to any portion of the HVAC system subject to seismic evaluation in accordance with applicable codes, including distributed systems (e.g., ductwork, piping).
B. Seismic Restraint: Structural members or assemblies of members or manufactured elements specifically designed and applied for transmitting seismic forces between components and the seismic force-resisting system of the structure.

1.03 REFERENCE STANDARDS

A. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures Most Recent Edition Cited by Referring Code or Reference Standard.
B. ASCE 19 - Structural Applications of Steel Cables for Buildings 2016.
C. ASHRAE (HVACA) - ASHRAE Handbook - HVAC Applications Most Recent Edition Cited by Referring Code or Reference Standard.
D. FEMA 412 - Installing Seismic Restraints for Mechanical Equipment 2014.
E. FEMA 413 - Installing Seismic Restraints for Electrical Equipment 2004.
F. FEMA 414 - Installing Seismic Restraints for Duct and Pipe 2004.
G. FEMA E-74 - Reducing the Risks of Nonstructural Earthquake Damage 2012.
H. ICC (IBC) - International Building Code Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
I. ICC-ES AC156 - Acceptance Criteria for Seismic Certification by Shake-Table Testing of Nonstructural Components 2010, with Editorial Revision (2015).
J. MFMA-4 - Metal Framing Standards Publication 2004.
K. SMACNA (SRM) - Seismic Restraint Manual Guidelines for Mechanical Systems 2008.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordination:
   1. Coordinate selection and arrangement of vibration isolation and/or seismic control components with the actual equipment to be installed.
   2. Coordinate the work with other trades to provide additional framing and materials required for installation.
   3. Coordinate compatibility of support and attachment components with mounting surfaces at the installed locations.
   4. Seismic Controls:
      a. Coordinate the arrangement of seismic restraints with piping, conduit, equipment, and other potential conflicts installed under other sections or by others.
      b. Coordinate the work with other trades to accommodate relative positioning of essential and nonessential components in consideration of seismic interaction.
   5. Notify Architect of any conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.

B. Sequencing:
   1. Do not install products on or provide attachment to concrete surfaces until concrete has fully cured in accordance with Section 03 3000.

1.05 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements for submittal procedures.
B. Design Documents: Prepare and submit all information required for plan review and permitting by authorities having jurisdiction, including but not limited to floor plans, details, and calculations.
C. Product Data: Provide manufacturer's standard catalog pages and data sheets for products, including materials, fabrication details, dimensions, and finishes documenting compliance with PART 2.
   1. Vibration Isolators: Include rated load capacities and deflections; include information on color coding or other identification methods for spring element load capacities.
   2. Seismic Controls: Include seismic load capacities.
D. Shop Drawings - Vibration Isolation Systems:
   1. Include dimensioned plan views and sections indicating proposed arrangement of vibration isolators; indicate equipment weights and static deflections.
   2. Vibration-Isolated Equipment Support Bases: Include base weights, including concrete fill where applicable; indicate equipment mounting provisions.
E. Shop Drawings - Seismic Controls:
   1. Include dimensioned plan views and sections indicating proposed HVAC component locations and distributed system routing, with locations and details of gravity supports and seismic restraints and associated attachments.
   2. Identify mounting conditions required for equipment seismic qualification.
   3. Identify anchor manufacturer, type, minimum embedment, minimum spacing, minimum member thickness, and minimum edge distance requirements.
   4. Indicate proposed arrangement of distributed system trapeze support groupings.
   5. Indicate proposed locations for distributed system flexible fittings and/or connections.
   6. Indicate locations of seismic separations where applicable.
   7. Include point load drawings indicating design loads transmitted to structure at each attachment location.
F. Seismic Design Data:
   1. Compile information on project-specific characteristics of actual installed HVAC components necessary for determining seismic design forces required to design appropriate seismic controls, including but not limited to the following.
      a. Component operating weight and center of gravity.
      b. Component elevation in the building in relation to the roof elevation (z/h).
      c. Component importance factor (Ip).
      d. For distributed systems, component materials and connection methods.
      e. Component amplification factor (ap) and component response modification factor (Rp), determined in accordance with ASCE 7 tables.
      f. Applicability of overstrength factor (for certain anchorage in concrete and masonry).
   2. Include structural calculations, stamped or sealed by seismic controls designer, demonstrating suitability of seismic controls for seismic design forces.
G. Certification for seismically qualified equipment; identify basis for certification.
H. Evaluation Reports: For products specified as requiring evaluation and recognition by a qualified evaluation service, provide current evaluation reports.
I. Manufacturer's Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination,

preparation, and installation of product.

J. Evidence of qualifications for seismic controls designer.
K. Evidence of qualifications for manufacturer.
L. Manufacturer's detailed field testing and inspection procedures.
M. Field quality control test reports.

1.06 QUALITY ASSURANCE

A. Comply with applicable building code.
B. Maintain at the project site a copy of each referenced document that prescribes execution requirements.
C. Seismic Controls Designer Qualifications: Registered professional engineer licensed in the State in which the Project is located and with minimum five years experience designing seismic restraints for nonstructural components.
   1. Designer may be employed by the manufacturer of the seismic restraint products.
D. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Receive, inspect, handle, and store products in accordance with manufacturer's instructions.

PART 2 PRODUCTS

2.01 VIBRATION ISOLATION REQUIREMENTS

A. Design and provide vibration isolation systems to reduce vibration transmission to supporting structure from vibration-producing HVAC equipment and/or HVAC connections to vibration-isolated equipment.
B. Comply with applicable general recommendations of ASHRAE (HVACA), where not in conflict with other specified requirements:
C. General Requirements:
   1. Select vibration isolators to provide required static deflection.
   2. Select vibration isolators for uniform deflection based on distributed operating weight of actual installed equipment.
   3. Select seismic type vibration isolators to comply with seismic design requirements, including conditions of equipment seismic certification where applicable.
   4. Select vibration isolators for outdoor equipment to comply with wind design requirements.
D. Equipment Isolation: Make-up Air Unit..
E. Thrust Restraint Applications:
   1. Use thrust restraints to resist horizontal motion due to thrust for fan heads, suspended fans, and base-mounted and suspended air handling equipment operating at 2.0 inches wg (0.5 kPa) or greater total static pressure.
   2. Minimum Static Deflection: Same as static deflection of equipment.
   3. Limit lateral movement to 0.25 inch (6 mm) or less unless otherwise indicated.

2.02 SEISMIC CONTROL REQUIREMENTS

A. Design and provide HVAC component restraints, supports, and attachments suitable for seismic loads determined in accordance with applicable codes, as well as gravity and operating loads and other structural design considerations of the installed location. Consider wind loads for outdoor HVAC components.
B. Seismic Design Criteria: Obtain from project Structural Engineer of Record.
C. Component Importance Factor (Ip): HVAC components to be assigned a component importance factor (Ip) of 1.5 unless otherwise indicated.
D. Seismic Qualification of Equipment:
   1. Provide special certification for HVAC equipment furnished under other sections and assigned a component importance factor (Ip) of 1.5, certifying that equipment will remain

operable following a design level earthquake.

2. Seismic qualification to be by shake table testing in accordance with recognized testing standard procedure, such as ICC-ES AC156, acceptable to authorities having jurisdiction.
3. Notify Architect and obtain direction where mounting restrictions required by conditions of seismic certification conflict with specified requirements.
4. Seismically qualified equipment to be furnished with factory-installed labels referencing certificate of compliance and associated mounting restrictions.

E. Seismic Restraints:
1. Provide seismic restraints for HVAC components except where exempt according to applicable codes and specified seismic design criteria, as approved by authorities having jurisdiction.
2. Seismic Restraint Exemptions:
   a. Exemptions for Seismic Design Category C:
      1) HVAC components where either of the following apply:
         (a) The component importance factor (Ip) is 1.0 and the component is positively attached to the structure.
         (b) The component weighs 20 pounds (89 N) or less or, in the case of a distributed system, 5 pounds per foot (73 N/m) or less.
      2) HVAC piping with component importance factor (Ip) of 1.5 and nominal pipe size of 2 inch (50 mm) or less, where flexible connections, expansion loops, or other assemblies are provided between piping and associated components, and where piping is positively attached to the structure; exemption does not apply to piping constructed of low-deformability materials (e.g., cast iron, glass, nonductile plastics).
   b. Exemptions for Seismic Design Category D, E, and F:
      1) Discrete HVAC components that are positively attached to the structure where either of the following apply:
         (a) The component weighs 400 pounds (1,780 N) or less, has a center of mass located 4 feet (1.22 m) or less above the adjacent floor level, flexible connections are provided between the component and associated ductwork, piping, and conduit, and the component importance factor (Ip) is 1.0.
         (b) The component weighs 20 pounds (89 N) or less or, in the case of a distributed system, 5 pounds per foot (73 N/m) or less.
      2) HVAC piping with component importance factor (Ip) of 1.0 and nominal pipe size of 3 inch (80 mm) or less, or with component importance factor (Ip) of 1.5 and nominal pipe size of 1 inch (25 mm) or less, where flexible connections, expansion loops, or other assemblies are provided between piping and associated components, and where piping is positively attached to the structure; exemption does not apply to piping constructed of low-deformability materials (e.g., cast iron, glass, nonductile plastics).
   c. Duct System Exemptions, All Seismic Design Categories:
      1) Duct systems not designed to carry toxic, highly toxic, or flammable gases and not used for smoke control with component importance factor (Ip) of 1.0, where flexible connections or other assemblies are provided between duct system and associated components, where duct system is positively attached to the structure, and where one of the following apply:
         (a) Trapeze supported duct with trapeze assemblies using 3/8 inch (10 mm) diameter rod hangers not exceeding 12 inches (305 mm) in length from support point connection to the supporting structure, and the total weight supported by

any single trapeze is 100 pounds (445 N) or less.

(b) Trapeze supported duct with trapeze assemblies using 1/2 inch (13 mm) diameter rod hangers not exceeding 12 inches (305 mm) in length from support point connection to the supporting structure, and the total weight supported by any single trapeze is 200 pounds (890 N) or less.

(c) Trapeze supported duct with trapeze assemblies using 1/2 inch (13 mm) diameter rod hangers not exceeding 24 inches (610 mm) in length from support point connection to the supporting structure, and the total weight supported by any single trapeze is 100 pounds (445 N) or less.

(d) Hanger supported duct with individual rod hangers 3/8 inch (10 mm) or 1/2 inch (13 mm) in diameter not exceeding 12 inches (305 mm) in length from support point connection to the supporting structure, and the total weight supported by any single rod is 50 pounds (220 N) or less.

2) Duct systems not designed to carry toxic, highly toxic, or flammable gases and not used for smoke control, where there are provisions to avoid impact with other ducts or mechanical components or to protect ducts in the event of such impact, and where duct system is positively attached to the structure and has a cross sectional area of less than 6 square feet (0.557 sq m) and weighs 20 pounds per foot (292 N/m) or less.

d. HVAC Piping Exemptions, All Seismic Design Categories:

1) HVAC piping where flexible connections, expansion loops, or other assemblies are provided between piping and associated components, where piping is positively attached to the structure, and where one of the following apply:

(a) Trapeze supported piping weighing less than 10 pounds per foot (146 N/m), where all pipes supported meet size requirements for exemption as single pipes described under specific seismic design category exemptions above.

(b) Trapeze supported piping with trapeze assemblies using 3/8 inch (10 mm) diameter rod hangers not exceeding 12 inches (305 mm) in length from support point connection to the supporting structure, where all pipes supported have a component importance factor (Ip) of 1.0 and meet size requirements for exemption as single pipes described under specific seismic design category exemptions above, and where the total weight supported by any single trapeze is 100 pounds (445 N) or less.

(c) Trapeze supported piping with trapeze assemblies using 1/2 inch (13 mm) diameter rod hangers not exceeding 12 inches (305 mm) in length from support point connection to the supporting structure, where all pipes supported have a component importance factor (Ip) of 1.0 and meet size requirements for exemption as single pipes described under specific seismic design category exemptions above, and where the total weight supported by any single trapeze is 200 pounds (890 N) or less.

(d) Trapeze supported piping with trapeze assemblies using 1/2 inch (13 mm) diameter rod hangers not exceeding 24 inches (610 mm) in length from support point connection to the supporting structure, where all pipes supported have a component importance factor (Ip) of 1.0 and meet size requirements for exemption as single pipes described under specific seismic design category exemptions above, and where the total weight supported by any single trapeze is 100 pounds (445 N) or less.

(e) Hanger supported piping with individual rod hangers 3/8 inch (10 mm) or 1/2 inch (13 mm) in diameter not exceeding 12 inches (305 mm) in length from

support point connection to the supporting structure, where pipe has a component importance factor (Ip) of 1.0 and meets size requirements for exemption as single pipes described under specific seismic design category exemptions above, and where the total weight supported by any single rod is 50 pounds (220 N) or less.

3. Seismic Restraint Exemptions:
   a. Exemptions for Seismic Design Category C:
      1) HVAC components with component importance factor (Ip) of 1.0.
      2) HVAC piping with component importance factor (Ip) of 1.5 and nominal pipe size of 2 inch (50 mm) or less; exemption does not apply to piping constructed of low-deformability materials (e.g., cast iron, glass, nonductile plastics).
   b. Exemptions for Seismic Design Category D, E, and F:
      1) HVAC components with component importance factor (Ip) of 1.0 where all of the following apply:
         (a) The component is positively attached to the structure.
         (b) Flexible connections are provided between the component and associated ductwork, piping, and conduit.
         (c) Either:
            (1) The component weighs 400 pounds (1,780 N) or less and has a center of mass located 4 feet (1.22 m) or less above the adjacent floor level.
            (2) The component weighs 20 pounds (89 N) or less or, in the case of a distributed system, 5 pounds per foot (73 N/m) or less.
      2) HVAC piping with component importance factor (Ip) of 1.0 and nominal pipe size of 3 inch (80 mm) or less, or with component importance factor (Ip) of 1.5 and nominal pipe size of 1 inch (25 mm) or less; exemption does not apply to piping constructed of low-deformability materials (e.g., cast iron, glass, nonductile plastics).
   c. Ductwork Exemptions, All Seismic Design Categories:
      1) Ductwork not designed to carry toxic, highly toxic, or flammable gases and not used for smoke control where any of the following apply:
         (a) Trapeze supported ductwork weighing less than 10 pounds per foot (146 N/m).
         (b) Hanger supported ductwork where each hanger in the duct run is 12 inches (305 mm) or less in length from the duct support to the supporting structure; rod hangers, where used, to be equipped with swivels.
         (c) Ductwork having a cross sectional area of less than 6 square feet (0.557 sq m) or weighing 17 pounds per foot (248 N/m) or less, and where there are provisions to avoid impact with other ducts or mechanical components or to protect ducts in the event of such impact.
   d. HVAC Piping Exemptions, All Seismic Design Categories:
      1) Trapeze supported piping weighing less than 10 pounds per foot (146 N/m), where all pipes supported meet requirements for exemption as single pipes described under specific seismic design category exemptions above.
      2) Hanger supported piping where each hanger in the piping run is 12 inches (305 mm) or less in length from the pipe support to the supporting structure; rod hangers, where used, to be equipped with swivels.
4. Comply with applicable general recommendations of the following, where not in conflict with applicable codes, seismic design criteria, or other specified requirements:
   a. ASHRAE (HVACA).
   b. FEMA 412.
   c. FEMA 413.

d. FEMA 414.
e. FEMA E-74.
f. SMACNA (SRM).

5. Seismic restraint capacities to be verified by a Nationally Recognized Testing Laboratory (NRTL) or certified by an independent third-party registered professional engineer acceptable to authorities having jurisdiction.
6. Seismic Type Vibration Isolators:
   a. Comply with seismic design requirements, including conditions of equipment seismic certification where applicable.
7. External Seismic Snubber Assemblies:
   a. Provide quantity and arrangement of external seismic snubber assemblies as required to restrain equipment in all directions (both lateral and vertical).
   b. Do not use external seismic snubber assemblies that restrain equipment only in one or more lateral directions (but not vertical) except where uplift forces are zero or are addressed by other restraints.
8. Seismic Restraint Systems:
   a. Except where otherwise restricted, use of either cable or rigid restraints is permitted.
   b. Use only cable restraints to restrain vibration-isolated HVAC components, including distributed systems.
   c. Use only one restraint system type for a given HVAC component or distributed system (e.g., ductwork, piping) run; mixing of cable and rigid restraints on a given component/run is not permitted.
   d. Size restraint elements, including anchorage, to resist seismic loads as necessary to restrain HVAC component in all lateral directions; consider bracket geometry in anchor load calculations.
   e. Use rod stiffener clips to attach bracing to hanger rods as required to prevent rod buckling from vertical (upward) compressive load introduced by cable or rigid restraints loaded in tension, in excess of downward tensile load due to supported HVAC component weight.
   f. Select hanger rods and associated anchorage as required to accommodate vertical (downward) tensile load introduced by rigid restraints loaded in compression, in addition to downward tensile load due to supported HVAC component weight.
   g. Clevis hangers may only be used for attachment of transverse restraints; do not use for attachment of longitudinal restraints.
   h. Where seismic restraints are attached to clevis hangers, provide clevis bolt reinforcement accessory to prevent clevis hanger deformation.
   i. Do not introduce lateral loads on open bar joist chords or the weak axis of beams, or loads in any direction at other than panel points unless approved by project Structural Engineer of Record.
   j. Manufacturer's certified seismic restraint design may be submitted as an alternative to project-specific design and documentation, subject to approval of authorities having jurisdiction.
9. Ductwork Applications:
   a. Provide independent support and seismic restraint for in-line components (e.g., fans, heat exchangers, humidifiers) having an operating weight greater than 75 pounds (334 N).
   b. Positively attach appurtenances (e.g., dampers, louvers, diffusers) with mechanical fasteners.

F. Seismic Attachments:

1. Attachments to be bolted, welded, or otherwise positively fastened without consideration of frictional resistance produced by the effects of gravity.
2. Post-Installed Concrete and Masonry Anchors: Evaluated and recognized by qualified evaluation service acceptable to authorities having jurisdiction for compliance with applicable building code, and qualified for seismic applications; concrete anchors to be qualified for installation in both cracked and uncracked concrete.
3. Do not use power-actuated fasteners except where permitted by applicable code.
4. Do not use friction clips (devices that rely on mechanically applied friction to resist loads). Beam clamps may be used for supporting sustained loads where provided with restraining straps.
5. Comply with anchor minimum embedment, minimum spacing, minimum member thickness, and minimum edge distance requirements.
6. Concrete Housekeeping Pads:
    a. Increase size of pad as required to comply with anchor requirements.
    b. Provide pad reinforcement and doweling to ensure integrity of pad and connection and to provide adequate load path from pad to supporting structure.

G. Seismic Interactions:
1. Include provisions to prevent seismic impact between HVAC components and other structural or nonstructural components.
2. Include provisions such that failure of a component, either essential or nonessential, does not cause the failure of an essential component.
3. Comply with minimum clearance requirements between HVAC equipment, distribution systems, and associated supports and fire protection sprinkler system drops and sprigs.

H. Seismic Relative Displacement Provisions:
1. Use suitable fittings or flexible connections to accommodate:
    a. Relative displacements at connections between components, including distributed systems (e.g., ductwork, piping); do not exceed load limits for equipment utility connections.
    b. Relative displacements between component supports attached to dissimilar parts of structure that may move differently during an earthquake.
    c. Design displacements at seismic separations.
    d. Anticipated drifts between floors.
2. Include provisions to prevent interruption of utility service due to seismic displacements.

2.03 VIBRATION ISOLATORS

A. Manufacturers:
1. Vibration Isolators:
    a. Kinetics Noise Control, Inc: www.kineticsnoise.com/#sle.
    b. Mason Industries: www.mason-ind.com/#sle.
    c. M.W. Sausse & Co., Inc.: www.vibrex.net.
    d. Amber/Booth (VMC): www.thevmcgroup.com.
2. Source Limitations: Furnish vibration-isolators and associated accessories produced by a single manufacturer and obtained from a single supplier.

B. General Requirements:
1. Resilient Materials for Vibration Isolators: Oil, ozone, and oxidant resistant.
2. Spring Elements for Spring Isolators:
    a. Color code or otherwise identify springs to indicate load capacity.
    b. Lateral Stability: Minimum lateral stiffness to vertical stiffness ratio of 0.8.
    c. Designed to operate in the linear portion of their load versus deflection curve over deflection range of not less than 50 percent above specified deflection.

d. Designed to provide additional travel to solid of not less than 50 percent of rated deflection at rated load.
e. Selected to provide designed deflection of not less than 75 percent of specified deflection.
f. Selected to function without undue stress or overloading.

3. Seismic Snubbing Elements for Seismic Isolators:
   a. Air Gap: Between 0.125 inches (3 mm) and 0.25 inches (6 mm) unless otherwise indicated.
   b. Points of Contact: Cushioned with resilient material, minimum 0.25 inch (6 mm) thick; capable of being visually inspected for damage and replaced.

C. Vibration Isolators for Seismic Applications:
1. Resilient Material Isolator Mounts, Seismic:
   a. Description: Mounting assemblies for bolting equipment to supporting structure utilizing elastomeric (e.g., neoprene, rubber) isolator material; specifically designed and rated for seismic applications with integral snubbing in all directions.
2. Restrained Spring Isolators, Seismic:
   a. Description: Isolator assembly consisting of single or multiple free-standing, laterally stable steel spring(s) in series with elastomeric (e.g., neoprene, rubber) isolator material within a metal housing designed to prevent movement of supported equipment above an adjustable vertical limit stop; specifically designed and rated for seismic applications with integral snubbing in all directions.
   b. Bottom Load Plate: Steel with provisions for bolting to supporting structure as required.
   c. Furnished with integral leveling device for positioning and securing supported equipment.
   d. Provides constant free and operating height.
3. Resilient Material Isolator Hangers, Seismic:
   a. Description: Isolator assembly designed for installation in hanger rod suspension system utilizing elastomeric (e.g., neoprene, rubber) isolator material for the lower hanger rod connection; specifically designed and rated for seismic applications with vertical limit stop to prevent upward travel of hanger rod and cushion impact.
4. Spring Isolator Hangers, Seismic:
   a. Description: Isolator assembly designed for installation in hanger rod suspension system utilizing single or multiple free-standing, laterally stable steel spring(s) in series with an elastomeric element for the lower hanger rod connection; specifically designed and rated for seismic applications with vertical limit stop to prevent upward travel of hanger rod and cushion impact.
   b. Designed to accommodate misalignment of bottom hanger rod up to 30 degrees (plus/minus 15 degrees) without short-circuiting of isolation.
5. Combination Resilient Material/Spring Isolator Hangers, Seismic:
   a. Description: Isolator assembly designed for installation in hanger rod suspension system utilizing single or multiple free-standing, laterally stable steel spring(s) for the lower hanger rod connection and elastomeric (e.g., neoprene, rubber) isolator material for the upper hanger rod connection; specifically designed and rated for seismic applications with vertical limit stop to prevent upward travel of hanger rod and cushion impact.
   b. Designed to accommodate misalignment of bottom hanger rod up to 30 degrees (plus/minus 15 degrees) without short-circuiting of isolation.

2.04 ACOUSTICAL AND VIBRATION ISOLATORS

A. Manufacturers:

1. Acoustical and Vibration Isolators:
   a. HoldRite, a brand of Reliance Worldwide Corporation: www.holdrite.com/#sle.
   b. Substitutions: See Section 01 6000 - Product Requirements.
2. Source Limitations: Furnish isolators and associated accessories produced by a single manufacturer and obtained from a single supplier.

B. General Requirements:
1. Acoustical Isolation System: Through-stud isolators, pipe clamps, riser clamp pads, neoprene and felt lining material and associated support brackets.

2.05 EXTERNAL SEISMIC SNUBBER ASSEMBLIES

A. Manufacturers:
1. External Seismic Snubber Assemblies:
   a. Kinetics Noise Control, Inc: www.kineticsnoise.com/#sle.
   b. Mason Industries: www.mason-ind.com/#sle.
   c. M.W. Sausse & Co., Inc.: www.vibrex.net.
   d. Amber/Booth: www.thevmcgroup.com.
   e. Substitutions: See Section 01 6000 - Product Requirements.
2. Source Limitations: Furnish external seismic snubber assemblies and associated accessories produced by the same manufacturer as the vibration isolators and obtained from a single supplier.

B. Description: Steel snubbing assemblies designed for external attachment to both equipment and supporting structure that, as part of a complete system, restrain equipment motion in all directions during a seismic event while maintaining vibration isolation during normal operation.

C. Seismic Snubbing Elements:
1. Air Gap: Between 0.125 inches (3 mm) and 0.25 inches (6 mm) unless otherwise indicated.
2. Points of Contact: Cushioned with resilient material, minimum 0.25 inch (6 mm) thick; capable of being visually inspected for damage and replaced.

2.06 SEISMIC RESTRAINT SYSTEMS

A. Manufacturers:
1. Seismic Restraint Systems:
   a. Kinetics Noise Control, Inc: www.kineticsnoise.com/#sle.
   b. Mason Industries: www.mason-ind.com/#sle.
   c. AFCON, a brand of Anvil International: www.anvilintl.com/#sle.
   d. Eaton Corporation: www.eaton.com/#sle.
2. Source Limitations: Furnish seismic restraint system components and accessories produced by a single manufacturer and obtained from a single supplier.

B. Description: System components and accessories specifically designed for field assembly and attachment of seismic restraints.

C. Cable Restraints:
1. Comply with ASCE 19.
2. Cables: Pre-stretched, galvanized steel wire rope with certified break strength.
3. Cable Connections: Use only swaged end fittings. Cable clips and wedge type end fittings are not permitted in accordance with ASCE 19.
4. Use protective thimbles for cable loops where potential for cable damage exists.

D. Rigid Restraints: Use MFMA-4 steel channel (strut), steel angle, or steel pipe for structural element; suitable for both compressive and tensile design loads.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that field measurements are as shown on the drawings.

B. Verify that mounting surfaces are ready to receive vibration isolation and/or seismic control components and associated attachments.
C. Verify that conditions are satisfactory for installation prior to starting work.

3.02 CODE-REQUIRED SPECIAL INSPECTIONS

A. Arrange work to accommodate tests and/or inspections performed by Special Inspection Agency employed by Owner or Architect in accordance with Section 01 4533 and statement of special inspections as required by applicable building code.
B. Seismic special inspections include, but are not limited to:
   1. Seismically Qualified Equipment: Verification that label, anchorage, and mounting comply with the certificate of compliance.
   2. Installation and anchorage of piping systems designed to carry hazardous materials and their associated mechanical units for Seismic Design Categories C, D, E, and F; periodic inspection.
   3. Installation and anchorage of ductwork designed to carry hazardous materials for Seismic Design Categories C, D, E and F; periodic inspection.
   4. Installation and anchorage of vibration isolation systems for Seismic Design Categories C, D, E, and F where the approved Contract Documents require a nominal clearance of 1/4 inch (6.4 mm) or less between equipment support frame and seismic restraint; periodic inspection.
   5. Verification of required clearances between HVAC equipment, distribution systems, and associated supports and fire protection sprinkler system drops and sprigs for Seismic Design Categories C, D, E, and F; periodic inspection.
C. Prior to starting work, Contractor to submit written statement of responsibility to authorities having jurisdiction and to Owner acknowledging awareness of special requirements contained in the statement of special inspections.
D. Special Inspection Agency services do not relieve Contractor from performing inspections and testing specified elsewhere.

3.03 INSTALLATION

A. Install products in accordance with manufacturer's instructions.
B. Install anchors and fasteners in accordance with ICC Evaluation Services, LLC (ICC-ES) evaluation report conditions of use where applicable.
C. Secure fasteners according to manufacturer's recommended torque settings.
D. Field-Welding (where approved by Architect): Comply with Section 05 5000.
E. Install flexible piping connections to provide sufficient slack for vibration isolation and/or seismic relative displacements as indicated or as required.
F. Vibration Isolation Systems:
   1. Vibration-Isolated Equipment Support Bases:
      a. Provide specified minimum clearance beneath base.
   2. Spring Isolators:
      a. Position equipment at operating height; provide temporary blocking as required.
      b. Lift equipment free of isolators prior to lateral repositioning to avoid damage to isolators.
      c. Level equipment by adjusting isolators gradually in sequence to raise equipment uniformly such that excessive weight or stress is not placed on any single isolator.
   3. Isolator Hangers:
      a. Use precompressed isolator hangers where required to facilitate installation and prevent damage to equipment utility connection provisions.
      b. Locate isolator hangers at top of hanger rods in accordance with manufacturer's instructions.

4. Thrust Restraints:
   a. Adjust restraint movement under normal operating static pressure.
5. Clean debris from beneath vibration-isolated equipment that could cause short-circuiting of isolation.
6. Use elastomeric grommets for attachments where required to prevent short-circuiting of isolation.
7. Adjust isolators to be free of isolation short circuits during normal operation.
8. Do not overtighten fasteners such that resilient material isolator pads are compressed beyond manufacturer's maximum recommended deflection.

G. Seismic Controls:
1. Provide specified snubbing element air gap; remove any factory-installed spacers, debris, or other obstructions.
2. Use only specified components, anchorage, and hardware evaluated by seismic design. Comply with conditions of seismic certification where applicable.
3. Where mounting hole diameter exceeds bolt diameter by more than 0.125 inch (3 mm), use epoxy grout, elastomeric grommet, or welded washer to reduce clearance to 0.125 inch (3 mm) or less.
4. Equipment with Sheet Metal Housings:
   a. Use Belleville washers to distribute stress over a larger surface area of the sheet metal connection interface as approved by manufacturer.
   b. Attach additional steel as approved by manufacturer where required to transfer loads to structure.
   c. Where mounting surface is irregular, do not shim housing; reinforce housing with additional steel as approved by manufacturer.
5. Seismic Restraint Systems:
   a. Do not attach seismic restraints and gravity supports to dissimilar parts of structure that may move differently during an earthquake.
   b. Install restraints within permissible angles in accordance with seismic design.
   c. Install cable restraints straight between component/run and structural attachment; do not bend around other nonstructural components or structural elements.
   d. Install cable restraints for vibration-isolated components slightly slack to prevent short-circuiting of isolation.
   e. Install hanger rod stiffeners where indicated using only specified clamps; do not weld stiffeners to hanger rod.

3.04 FIELD QUALITY CONTROL

A. See Section 01 4000 - Quality Requirements, for additional requirements.
B. Inspect vibration isolation and/or seismic control components for damage and defects.
C. Provide manufacturer representative or authorized technician services to assist with inspection and testing of vibration isolation systems and seismic controls. Submit a detailed copy of manufacturer recommended inspection, testing, and field report procedures.
D. Vibration Isolation Systems:
1. Verify isolator static deflections.
2. Verify required clearance beneath vibration-isolated equipment support bases.
3. Verify vibration isolation performance during normal operation; investigate sources of isolation short circuits.

E. Seismic Controls:
1. Verify snubbing element air gaps.

F. Correct deficiencies and replace damaged or defective vibration isolation and/or seismic control components.

G. Submit detailed reports indicating inspection and testing results and corrective actions taken.

END OF SECTION

SECTION 23 0553
IDENTIFICATION FOR HVAC PIPING AND EQUIPMENT

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Nameplates.
B. Tags.
C. Pipe markers.
D. Labels.
E. Lockout devices.

1.02 RELATED REQUIREMENTS

A. Section 09 9123 - Interior Painting: Identification painting.

1.03 REFERENCE STANDARDS

A. ASME A13.1 - Scheme for the Identification of Piping Systems 2020.
B. ASTM D709 - Standard Specification for Laminated Thermosetting Materials 2017.

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements for submittal procedures.
B. List: Submit list of wording, symbols, letter size, and color coding for mechanical identification.
C. Chart and Schedule: Submit valve chart and schedule, including valve tag number, location, function, and valve manufacturer's name and model number.
D. Product Data: Provide manufacturers catalog literature for each product required.
E. Manufacturer's Installation Instructions: Indicate special procedures, and installation.
F. Project Record Documents: Record actual locations of tagged valves.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Brady Corporation: www.bradycorp.com.
B. Safety Sign Company: www.safetysignco.com.
C. Seton Identification Products: www.seton.com/aec.
D. Substitutions: See Section 01 60 00 - Product Requirements

2.02 NAMEPLATES

A. Description: Laminated three-layer plastic with engraved letters.
    1. Letter Color: Black.
    2. Letter Height: 1/2 inch (13 mm).
    3. Background Color: Yellow.
    4. Plastic: Comply with ASTM D709.

2.03 TAGS

A. Plastic Tags: Laminated three-layer plastic with engraved black letters on light contrasting background color. Tag size minimum 1-1/2 inch (40 mm) diameter.
B. Metal Tags: Brass with stamped letters; tag size minimum 1-1/2 inch (40 mm) diameter with smooth edges.
C. Valve Tag Chart: Typewritten letter size list in anodized aluminum frame.

2.04 PIPE MARKERS

A. Color: Comply with ASME A13.1.
B. Plastic Pipe Markers: Factory fabricated, flexible, semi- rigid plastic, preformed to fit around pipe or pipe covering; minimum information indicating flow direction arrow and identification of fluid being conveyed.
C. Plastic Tape Pipe Markers: Flexible, vinyl film tape with pressure-sensitive adhesive backing and printed markings.
D. Underground Plastic Pipe Markers: Bright-colored continuously printed plastic ribbon tape, minimum 6 inches (150 mm) wide by 4 mil. (0.10 mm) thick, manufactured for direct burial

service.

2.05 LABELS

A. Description: Aluminum, size 1.9 x 0.75 inches, adhesive backed with printed identification.

2.06 LOCKOUT DEVICES

A. Lockout Hasps:
   1. Anodized aluminum or Reinforced nylon hasp with erasable label surface; size minimum 7-1/4 x 3 inches.

B. Valve Lockout Devices:
   1. Steel device preventing access to valve operator, accepting lock shackle.

PART 3 EXECUTION

3.01 PREPARATION

A. Degrease and clean surfaces to receive adhesive for identification materials.

B. Prepare surfaces in accordance with Section 09 9123 for stencil painting.

3.02 INSTALLATION

A. Install nameplates with corrosive-resistant mechanical fasteners, or adhesive. Apply with sufficient adhesive to ensure permanent adhesion and seal with clear lacquer.

B. Install tags with corrosion resistant chain.

C. Install plastic pipe markers in accordance with manufacturer's instructions.

D. Install plastic tape pipe markers complete around pipe in accordance with manufacturer's instructions.

E. Install underground plastic pipe markers 6 to 8 inches (150 to 200 mm) below finished grade, directly above buried pipe.

F. Identify air handling units, pumps, heat transfer equipment, tanks, and water treatment devices with 8 x 4 inch plastic nameplates. Small devices, such as in-line pumps, may be identified with tags.

G. Identify control panels and major control components outside panels with plastic nameplates.

H. Tag automatic controls, instruments, and relays. Key to control schematic.

I. Identify piping, concealed or exposed, with plastic pipe markers, plastic tape pipe markers. Use tags on piping 3/4 inch diameter and smaller. Identify service, flow direction, and pressure. Install in clear view and align with axis of piping. Locate identification not to exceed 20 feet on straight runs including risers and drops, adjacent to each valve and Tee, at each side of penetration of structure or enclosure, and at each obstruction.

J. Install ductwork with plastic nameplates. Identify with air handling unit identification number and area served. Locate identification at air handling unit, at each side of penetration of structure or enclosure, and at each obstruction.

END OF SECTION

SECTION 23 0593
TESTING, ADJUSTING, AND BALANCING FOR HVAC

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Testing, adjustment, and balancing of air systems.
B. Measurement of final operating condition of HVAC systems.

1.02 RELATED REQUIREMENTS

A. Section 01 2100 - Allowances: Inspection and testing allowances.
B. Section 01 4000 - Quality Requirements: Employment of testing agency and payment for services.
C. Section 01 9113 - General Commissioning Requirements: Commissioning requirements that apply to all types of work.

1.03 REFERENCE STANDARDS

A. AABC (NSTSB) - AABC National Standards for Total System Balance, 7th Edition 2016.
B. ASHRAE Std 111 - Measurement, Testing, Adjusting, and Balancing of Building HVAC Systems 2008, with Errata (2019).

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
B. Installer Qualifications: Submit name of adjusting and balancing agency and TAB supervisor for approval within 30 days after award of Contract.
C. Final Report: Indicate deficiencies in systems that would prevent proper testing, adjusting, and balancing of systems and equipment to achieve specified performance.
    1. Submit draft copies of report for review prior to final acceptance of Project. Provide final copies for Architect and for inclusion in operating and maintenance manuals.
    2. Provide reports in to Owner and Architect. Include set of reduced drawings with air outlets and equipment identified to correspond with data sheets, and indicating thermostat locations.
    3. Include actual instrument list, with manufacturer name, serial number, and date of calibration.
    4. Form of Test Reports: Where the TAB standard being followed recommends a report format use that; otherwise, follow ASHRAE Std 111.
    5. Units of Measure: Report data in both I-P (inch-pound) and SI (metric) units.
    6. Include the following on the title page of each report:
        a. Name of Testing, Adjusting, and Balancing Agency.
        b. Address of Testing, Adjusting, and Balancing Agency.
        c. Telephone number of Testing, Adjusting, and Balancing Agency.
        d. Project name.
        e. Project location.
        f. Project Architect.
        g. Project Engineer.
        h. Project Contractor.
        i. Project altitude.
        j. Report date.
D. Project Record Documents: Record actual locations of flow measuring stations and balancing valves and rough setting.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 GENERAL REQUIREMENTS

A. Perform total system balance in accordance with one of the following:

1. AABC (NSTSB), AABC National Standards for Total System Balance.
2. ASHRAE Std 111, Practices for Measurement, Testing, Adjusting and Balancing of Building Heating, Ventilation, Air-Conditioning, and Refrigeration Systems.

B. Begin work after completion of systems to be tested, adjusted, or balanced and complete work prior to Substantial Completion of the project.

C. Where HVAC systems and/or components interface with life safety systems, including fire and smoke detection, alarm, and control, coordinate scheduling and testing and inspection procedures with the authorities having jurisdiction.

D. TAB Agency Qualifications:
1. Company specializing in the testing, adjusting, and balancing of systems specified in this section.
2. Having minimum of three years documented experience.

E. TAB Supervisor and Technician Qualifications: Certified by same organization as TAB agency.

F. TAB Supervisor Qualifications: Professional Engineer licensed in the State in which the Project is located.

G. Pre-Qualified TAB Agencies:
1. Northwest Engineering Service, Inc.
2. Air Balancing Specialty.
3. Neudorfer Engineers.
4. Precisionaire Northwest.
5. Accurate Balancing Agency, Inc.
6. Substitutions: See Section 01 6000 - Product Requirements.

3.02 EXAMINATION

A. Verify that systems are complete and operable before commencing work. Ensure the following conditions:
1. Systems are started and operating in a safe and normal condition.
2. Temperature control systems are installed complete and operable.
3. Proper thermal overload protection is in place for electrical equipment.
4. Final filters are clean and in place. If required, install temporary media in addition to final filters.
5. Duct systems are clean of debris.
6. Fans are rotating correctly.
7. Fire and volume dampers are in place and open.
8. Air coil fins are cleaned and combed.
9. Access doors are closed and duct end caps are in place.
10. Air outlets are installed and connected.
11. Duct system leakage is minimized.

B. Submit field reports. Report defects and deficiencies that will or could prevent proper system balance.

C. Beginning of work means acceptance of existing conditions.

3.03 ADJUSTMENT TOLERANCES

A. Air Handling Systems: Adjust to within plus or minus 5 percent of design for supply systems and plus or minus 10 percent of design for return and exhaust systems.

B. Air Outlets and Inlets: Adjust total to within plus 10 percent and minus 5 percent of design to space. Adjust outlets and inlets in space to within plus or minus 10 percent of design.

3.04 RECORDING AND ADJUSTING

A. Ensure recorded data represents actual measured or observed conditions.

B. Permanently mark settings of valves, dampers, and other adjustment devices allowing settings to be restored. Set and lock memory stops.

C. After adjustment, take measurements to verify balance has not been disrupted or that such disruption has been rectified.
D. Leave systems in proper working order, replacing belt guards, closing access doors, closing doors to electrical switch boxes, and restoring thermostats to specified settings.
E. At final inspection, recheck random selections of data recorded in report. Recheck points or areas as selected and witnessed by the Owner.
F. Check and adjust systems approximately six months after final acceptance and submit report.

3.05 AIR SYSTEM PROCEDURE

A. Adjust air handling and distribution systems to provide required or design supply, return, and exhaust air quantities at site altitude.
B. Make air quantity measurements in ducts by Pitot tube traverse of entire cross sectional area of duct.
C. Measure air quantities at air inlets and outlets.
D. Adjust distribution system to obtain uniform space temperatures free from objectionable drafts and noise.
E. Use volume control devices to regulate air quantities only to extend that adjustments do not create objectionable air motion or sound levels. Effect volume control by duct internal devices such as dampers and splitters.
F. Vary total system air quantities by adjustment of fan speeds. Provide drive changes required. Vary branch air quantities by damper regulation.
G. Provide system schematic with required and actual air quantities recorded at each outlet or inlet.
H. Adjust outside air automatic dampers, outside air, return air, and exhaust dampers for design conditions.

3.06 SCOPE

A. Test, adjust, and balance the following:
    1. Air Handling Units.
    2. Fans.
    3. Air Filters.
    4. Air Inlets and Outlets.

3.07 MINIMUM DATA TO BE REPORTED

A. Electric Motors:
    1. Manufacturer.
    2. Model/Frame.
    3. HP/BHP.
    4. Phase, voltage, amperage; nameplate, actual, no load.
    5. RPM.
    6. Service factor.
    7. Starter size, rating, heater elements.
    8. Sheave Make/Size/Bore.
B. V-Belt Drives:
    1. Identification/location.
    2. Required driven RPM.
    3. Driven sheave, diameter and RPM.
    4. Belt, size and quantity.
    5. Motor sheave diameter and RPM.
    6. Center to center distance, maximum, minimum, and actual.
C. Air Moving Equipment:
    1. Location.

2. Manufacturer.
3. Model number.
4. Serial number.
5. Arrangement/Class/Discharge.
6. Air flow, specified and actual.
7. Return air flow, specified and actual.
8. Outside air flow, specified and actual.
9. Total static pressure (total external), specified and actual.
10. Inlet pressure.
11. Discharge pressure.
12. Sheave Make/Size/Bore.
13. Number of Belts/Make/Size.
14. Fan RPM.

D. Return Air/Outside Air:
1. Identification/location.
2. Design air flow.
3. Actual air flow.
4. Design return air flow.
5. Actual return air flow.
6. Design outside air flow.
7. Actual outside air flow.
8. Return air temperature.
9. Outside air temperature.
10. Required mixed air temperature.
11. Actual mixed air temperature.
12. Design outside/return air ratio.
13. Actual outside/return air ratio.

E. Exhaust Fans:
1. Location.
2. Manufacturer.
3. Model number.
4. Serial number.
5. Air flow, specified and actual.
6. Total static pressure (total external), specified and actual.
7. Inlet pressure.
8. Discharge pressure.
9. Sheave Make/Size/Bore.
10. Number of Belts/Make/Size.
11. Fan RPM.

F. Duct Traverses:
1. System zone/branch.
2. Duct size.
3. Area.
4. Design velocity.
5. Design air flow.
6. Test velocity.
7. Test air flow.
8. Duct static pressure.
9. Air temperature.

10. Air correction factor.

G. Duct Leak Tests:
   1. Description of ductwork under test.
   2. Duct design operating pressure.
   3. Duct design test static pressure.
   4. Duct capacity, air flow.
   5. Maximum allowable leakage duct capacity times leak factor.
   6. Test apparatus:
      a. Blower.
      b. Orifice, tube size.
      c. Orifice size.
      d. Calibrated.
   7. Test static pressure.
   8. Test orifice differential pressure.
   9. Leakage.

H. Air Monitoring Stations:
   1. Identification/location.
   2. System.
   3. Size.
   4. Area.
   5. Design velocity.
   6. Design air flow.
   7. Test velocity.
   8. Test air flow.

I. Flow Measuring Stations:
   1. Identification/number.
   2. Location.
   3. Size.
   4. Manufacturer.
   5. Model number.
   6. Serial number.
   7. Design Flow rate.
   8. Design pressure drop.
   9. Actual/final pressure drop.
   10. Actual/final flow rate.
   11. Station calibrated setting.

J. Air Distribution Tests:
   1. Air terminal number.
   2. Room number/location.
   3. Terminal type.
   4. Terminal size.
   5. Area factor.
   6. Design velocity.
   7. Design air flow.
   8. Test (final) velocity.
   9. Test (final) air flow.
   10. Percent of design air flow.

END OF SECTION

SECTION 23 0713
DUCT INSULATION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Duct insulation.
B. Duct liner.
C. Jacketing and accessories.

1.02 RELATED REQUIREMENTS

A. Section 23 0553 - IDENTIFICATION FOR HVAC PIPING AND EQUIPMENT.
B. Section 23 3100 - HVAC Ducts and Casings: Glass fiber ducts.

1.03 REFERENCE STANDARDS

A. ASHRAE (FUND) - ASHRAE Handbook - Fundamentals Most Recent Edition Cited by Referring Code or Reference Standard.
B. ASTM B209/B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate 2021a.
C. ASTM C177 - Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus 2019.
D. ASTM C518 - Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus 2021.
E. ASTM C553 - Standard Specification for Mineral Fiber Blanket Thermal Insulation for Commercial and Industrial Applications 2013 (Reapproved 2019).
F. ASTM C916 - Standard Specification for Adhesives for Duct Thermal Insulation 2020.
G. ASTM C1071 - Standard Specification for Fibrous Glass Duct Lining Insulation (Thermal and Sound Absorbing Material) 2019.
H. ASTM C1338 - Standard Test Method for Determining Fungi Resistance of Insulation Materials and Facings 2019.
I. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2022.
J. ASTM E96/E96M - Standard Test Methods for Gravimetric Determination of Water Vapor Transmission Rate of Materials 2022.
K. ASTM G21 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi 2015, with Editorial Revision (2021).
L. NAIMA - North American Insulation Manufacturers Association Current Edition.
M. NFPA - National Fire Protection Association Current Edition.
N. SMACNA (DCS) - HVAC Duct Construction Standards Metal and Flexible 2021.
O. UL (Environmental) - Underwriter's Laboratories Environmental Current Edition.
P. UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials Current Edition, Including All Revisions.

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements for submittal procedures.
B. Product Data: Provide product description, thermal characteristics, list of materials and thickness for each service, and locations.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products of the type specified in this section with not less than three years of documented experience.
B. Applicator Qualifications: Company specializing in performing the type of work specified in this section and approved by manufacturer.
C. Surface-Burning Characteristics: For insulation and related materials, UL/ULC Classified per UL 723 or meeting ASTM E84, by a testing and inspecting agency acceptable to authorities

having jurisdiction. Factory label insulation and jacket materials and adhesive, mastic, tapes, and cement material containers, with appropriate markings of applicable testing agency.

D. Insulation Installed Indoors: Flame-spread index of 25 or less, and smoke-developed index of 50 or less.
E. Insulation Installed Outdoors: Flame-spread index of 75 or less, and smoke-developed index of 150 or less.
F. Formaldehyde Free: Third party certified with UL Environment Validation.
G. Biosoluble: As determined by research conducted by the International Agency for Research on Cancer (IARC) and supported by revised reports from the National Toxicology Program (NTP) and the California Office of Environmental Health Hazard Assessment. Certified by European Certification Board for Mineral Wool Products (EUCEB).
H. Low Emitting Materials: For all thermal and acoustical applications of Glass Mineral Wool Insulation Products, provide materials complying with the testing and products requirements of UL (GGG) UL GREENGUARD Gold Certification.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Accept materials on site in original factory packaging, labelled with manufacturer's identification, including product density and thickness.
B. Protect insulation from weather and construction traffic, dirt, water, chemical, and mechanical damage, by storing in original wrapping.

1.07 FIELD CONDITIONS

A. Maintain ambient temperatures and conditions required by manufacturers of adhesives, mastics, and insulation cements.
B. Maintain temperature during and after installation for minimum period of 24 hours.

1.08 DEFINITIONS

A. Thermal Conductivity (K value): Units of Btu-inch/hour per square foot per degree F.
B. UL GREENGUARD: Provides independent third-party, Indoor Air Quality (IAQ) certification of products for emissions of respirable particles and Volatile Organic Compounds (VOC's), including formaldehyde and other specific product-related pollutants. Certification is based upon criteria used by EPA, OSHA, and WHO.
C. ASJ+: All Service Jacket composed of aluminum foil reinforced with glass scrim bonded to a kraft paper interleaving with an outer film layer leaving no paper exposed.
D. ASJ: All Service Jacket (no outer film).
E. SSL+: Self-Sealing Lap with Advanced Closure System.
F. SSL: Self-Sealing Lap.
G. FSK: Foil Scrim Kraft; jacketing.
H. PSK: Poly Scrim Kraft; jacketing.
I. PVC: PolyVinyl Chloride.
J. Glass Mineral Wool: Interchangeable with fiber glass, but replacing the term in the attempt to disassociate and differentiate Glass Mineral Wool from the potential health and safety of special purpose or reinforcement products that do not meet the bio solubility criteria of insulation made from glass. Rock Mineral Wool will replace the traditional Mineral Wool label. Both are used in lieu of the Mineral Mineral Wool label.
K. UL Environment Claims Validation (ECV): service and label tests a manufacturer’s product and validates that the environmental claims they make in their marketing and packaging materials are factual. This Environmental Claims Validation (ECV) service will allow manufacturers to verify that their products contain a quantifiable amount of recycled content and, as such, help limit raw material extraction and reduce landfill waste. It also will enable products to qualify for LEED® points under Pilot Credit 43: MR - Certified Products.

L. Polybrominated diphenyl ethers (PBDE) such as Penta-BDE, Octa-BDE or Deca-BDE fire retardants: have been linked to adverse health effects after exposure in low concentrations.
M. UL Classified: UL has tested and evaluated samples of the product with respect to certain properties of the product. UL Classifies products to:
   1. Applicable UL requirements.
   2. Standards for safety.
   3. Standards of other National and International organizations.

PART 2 PRODUCTS

2.01 REGULATORY REQUIREMENTS

A. Surface Burning Characteristics: Flame spread index/Smoke developed index of 25/50, maximum, when tested in accordance with ASTM E84 or UL 723.

2.02 DUCT WRAP, FLEXIBLE

A. Manufacturer:
   1. Johns Manville; Microlite FSK: www.jm.com/#sle.
   2. Knauf Insulation; Atmosphere Duct Wrap: www.knaufinsulation.com/#sle.
   3. Owens Corning Corporation; SOFTR or EcoTouch: www.ocbuildingspec.com/#sle.
   4. Substitutions: See Section 01 6000 - Product Requirements.
B. Insulation: ASTM C553; flexible, noncombustible blanket.
   1. K (Ksi) value: [.29] at 75 degrees F ([____] at 24 degrees C), when tested in accordance with ASTM C177.
   2. Maximum Service Temperature: 250 degrees F (121 degrees C).
   3. Maximum Water Vapor Absorption: <5.0 percent by weight per ASTM C1104/C1104M.
C. Vapor Barrier Jacket:
   1. Kraft paper with glass fiber yarn and bonded to aluminized film.
   2. Moisture Vapor Permeability: 0.02 perm inch (0.029 ng/(Pa s m)), when tested in accordance with ASTM E96/E96M.
   3. Secure with pressure-sensitive tape.
D. Vapor Barrier Tape:
   1. Kraft paper reinforced with glass fiber yarn and bonded to aluminized film, with pressure-sensitive rubber-based adhesive.
E. Outdoor Vapor Barrier Mastic:
   1. Vinyl emulsion type acrylic or mastic, compatible with insulation, black color.
F. Tie Wire: Annealed steel, 16 gauge (1.29 mm diameter).

2.03 GLASS FIBER, RIGID

A. Manufacturer:
   1. CertainTeed Corporation; ToughGard® Rigid Liner Board: www.certainteed.com/#sle.
   2. Johns Manville; Permacote Linacoustic R-300: www.jm.com/#sle.
   3. Knauf Insulation; Rigid Plenum Liner: www.knaufinsulation.com/#sle.
   4. Substitutions: See Section 01 6000 - Product Requirements.
B. Insulation: ASTM C612; rigid, noncombustible blanket.
   1. ASTM C1071, Type II.
   2. K (Ksi) Value: 0.24 at 75 degrees F (0.036 at 24 degrees C), when tested in accordance with ASTM C518.
   3. Maximum Service Temperature: 450 degrees F (232 degrees C).
   4. Maximum Water Vapor Absorption: 5.0 percent.
   5. Maximum Density: 8.0 pcf (128 kg/cu m).
C. Vapor Barrier Jacket:
   1. Kraft paper with glass fiber yarn and bonded to aluminized film.

2. Moisture Vapor Permeability: 0.02 perm inch (0.029 ng/(Pa s m)), when tested in accordance with ASTM E96/E96M.
3. Secure with pressure-sensitive tape.

D. Vapor Barrier Tape:
1. Kraft paper reinforced with glass fiber yarn and bonded to aluminized film, with pressure-sensitive rubber-based adhesive.

E. Indoor Vapor Barrier Finish:
1. Cloth: Untreated; 9 oz/sq yd (305 g/sq m) weight, glass fabric.
2. Vinyl emulsion type acrylic, compatible with insulation, black color.

2.04 DUCT LINER

A. Manufacturers:
1. CertainTeed Corporation; ToughGard® Duct Liner: www.certainteed.com/#sle.
2. Johns Manville; Linacoustic RC: www.jm.com/#sle.
3. Knauf Insulation: www.knaufinsulation.com/#sle.
4. Owens Corning Corporation; QuietR Rotary Duct Insulation: www.ocbuildingspec.com/#sle.
5. Substitutions: See Section 01 6000 - Product Requirements.

B. Insulation: Non-corrosive, incombustible glass mineral wool complying with ASTM C1071; mat faced air stream surface and edges coated with acrylic polymer.
1. Fungal Resistance: No growth when tested according to ASTM G21.
2. Apparent Thermal Conductivity: Maximum of 0.31 at 75 degrees F (0.045 at 24 degrees C).
3. Service Temperature: Up to 250 degrees F (121 degrees C).
4. Rated Velocity on Coated Air Side for Air Erosion: 5,000 fpm (25.4 m/s), minimum.
5. Minimum Noise Reduction Coefficients:
a. 1/2 inch (13 mm) Thickness: 0.45.
b. 1 inch (25 mm) Thickness: 0.70.
c. 1-1/2 inches (40 mm) Thickness: 0.80.
d. 2 inch (50 mm) Thickness: 0.85.

C. Liner Fasteners: Galvanized steel.

PART 3 EXECUTION

3.01 EXAMINATION

A. Test ductwork for design pressure prior to applying insulation materials.
B. Verify that surfaces are clean, foreign material removed, and dry.

3.02 INSTALLATION

A. Install in accordance with manufacturer's instructions.
B. Install in accordance with NAIMA National Insulation Standards.
C. Insulated Ducts Conveying Air Below Ambient Temperature:
1. Provide insulation with vapor barrier jackets.
2. Finish with tape and vapor barrier jacket.
3. Continue insulation through walls, sleeves, hangers, and other duct penetrations.
4. Insulate entire system, including fittings, joints, flanges, fire dampers, flexible connections, and expansion joints.

D. Insulated Ducts Conveying Air Above Ambient Temperature:
1. Provide with or without standard vapor barrier jacket.
2. Insulate fittings and joints. Where service access is required, bevel and seal ends of insulation.

E. Duct and Plenum Liner Application:
1. Adhere insulation with adhesive for 100 percent coverage.

2. Secure insulation with mechanical liner fasteners. Refer to SMACNA (DCS) for spacing.
3. Seal and smooth joints. Seal and coat transverse joints.
4. Seal liner surface penetrations with adhesive.
5. Duct dimensions indicated are net inside dimensions required for air-flow. Increase duct size to allow for insulation thickness.
6. Refer to SMACNA publication for transverse edges for velocities over 2500 fpm.

3.03 SCHEDULES

A. Combustion Air Duct:
   1. Flexible Glass Fiber Duct Insulation: [Minimum 2] inches ([____] mm) thick or R-value of 7.

B. Outside Air Intake Ducts:
   1. Flexible Glass Mineral Wool Duct Insulation: Minimum 2 inches thick or R-Value of 8.

C. Supply Ducts:
   1. Flexible Glass Mineral Wool Duct Insulation: Minimum 1.5 inches thick or R-Value of 6.

END OF SECTION

SECTION 23 1123
NATURAL GAS PIPING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Pipe, pipe fittings, valves, and connections for natural gas piping systems.
B. Natural gas piping above grade.
C. Flexible pipe/connectors.
D. Unions and flanges.
E. Natural gas pressure regulators.

1.02 RELATED REQUIREMENTS

A. Section 23 0548 - VIBRATION ISOLATION AND SEISMIC CONTROLS FOR HVAC.
B. Section 23 0553 - IDENTIFICATION FOR HVAC PIPING AND EQUIPMENT.
C. Section 26 0583 - Wiring Connections: Electrical characteristics and wiring connections.

1.03 REFERENCE STANDARDS

A. ANSI Z21.80/CSA 6.22 - Line Pressure Regulators 2019.
B. ASME B1.20.1 - Pipe Threads, General Purpose, Inch 2013 (Reaffirmed 2018).
C. ASME BPVC-IX - Boiler and Pressure Vessel Code, Section IX - Qualification Standard for Welding, Brazing, and Fusing Procedures; Welders; Brazers; and Welding, Brazing, and Fusing Operators 2021.
D. ASME B16.3 - Malleable Iron Threaded Fittings: Classes 150 and 300 2021.
E. ASME B16.5 - Pipe Flanges and Flanged Fittings: NPS 1/2 through NPS 24 Metric/Inch Standard 2020.
F. ASME B16.39 - Malleable Iron Threaded Pipe Unions: Classes 150, 250, and 300 2019.
G. ASME B31.1 - Power Piping 2020.
H. ASME B31.9 - Building Services Piping 2020.
I. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless 2020.
J. ASTM A126 - Standard Specification for Gray Iron Castings for Valves, Flanges, and Pipe Fittings 2004 (Reapproved 2019).
K. MSS SP-89 - Pipe Hangers and Supports - Fabrication and Installation Practices; Manufacturers Standardization Society of the Valve and Fittings Industry, Inc.; 2003. Current Edition, Including All Revisions.
L. MSS SP-110 - Ball Valves Threaded, Socket-Welding, Solder Joint, Grooved and Flared Ends 2010, with Errata .

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
B. Product Data: Provide data on pipe materials, pipe fittings, valves, and accessories. Provide manufacturers catalog information. Indicate valve data and ratings.

1.05 QUALITY ASSURANCE

A. Perform work in accordance with applicable codes and standards.
B. Valves: Manufacturer's name and pressure rating marked on valve body.
C. Welding Materials and Procedures: Comply with ASME BPVC-IX and applicable state labor regulations.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Accept valves on site in shipping containers with labeling in place. Inspect for damage.
B. Provide temporary protective coating on cast iron and steel valves.
C. Provide temporary end caps and closures on piping and fittings. Maintain in place until installation.

D. Protect piping systems from entry of foreign materials by temporary covers, completing sections of the work, and isolating parts of completed system.

PART 2 PRODUCTS

2.01 NATURAL GAS PIPING, ABOVE GRADE

A. Steel Pipe: ASTM A53/A53M, Schedule 40 black.
   1. Fittings: ASME B16.3, malleable iron, or ASTM A234/A234M, wrought steel welding type.
   2. Joints: Threaded or welded to ASME B31.1.

2.02 STAINLESS STEEL GAS CONNECTORS

A. Manufacturers:
   1. Dormont, or approved equal.
B. Features and Specifications:
   1. Tubing: Annealed, 304 stainless steel (ASTM A240/A240M).
   2. Flare Nuts: Brass or plated steel.
   3. Adaptors: Brass or plated steel.
   4. Coating: Heavy-duty, antimicrobial, hot-dipped gray PVC (for 1⁄2" OD (21 series) and 5⁄8" OD (31 series only). Coating will not hold a flame.
   5. Approved for indoor/outdoor use with stationary gas appliances/equipment.
   6. Temperature rating of connector with adapters: -40°F to 150°F.
   7. Temperature rating with valves: -40°F to 125°F.
   8. 100% factory leak tested
   9. When installing a new appliance or when an existing appliance is moved to a new location a NEW gas connector must be used per manufacturer's installation instructions and per product standards ANSI Z21.24/CSA 6.10 and ANSI Z21.75/CSA 6.27
   10. Designed for occasional movement after installation. Repeated bending, flexing or extreme vibration must be avoided. Normal operation of a clothes dryer, rooftop HVAC unit or SIMILAR OUTDOOR APPLIANCE DOES NOT constitute extreme vibration or movement
C. Design Certifications and Approvals:
   1. ANSI Z21.24/CSA 6.10 - Connectors for Gas Appliances
   2. ANSI Z21.75/CSA 6.27 - Connectors for Outdoor Appliances and Manufactured Homes

2.03 FLANGES, UNIONS, AND COUPLINGS

A. Unions for Pipe Sizes 3 Inches (80 mm) and Under:
   1. Ferrous Pipe: Class 150 malleable iron threaded unions.
   2. Copper Tube and Pipe: Class 150 bronze unions with soldered joints.
B. Flanges for Pipe Size Over 1 Inch (25 mm):
   1. Ferrous Pipe: Class 150 malleable iron threaded or forged steel slip-on flanges; preformed neoprene gaskets.
   2. Copper Tube and Pipe: Class 150 slip-on bronze flanges; preformed neoprene gaskets.
C. Dielectric Connections: Bronze threaded nipple, minimum 3 inches long, with impervious isolation liner. Victaulic "Clearflow".

2.04 PIPE HANGERS AND SUPPORTS

A. Manufacturers:
   1. Tolco Inc.
   2. Tolco Inc.
   3. Anvil.
   4. Hubbard Enterprises/Holdrite.
   5. Michigan Hanger Company, Inc.
   6. PHD Manufacturing Co.
   7. Superstrut.
   8. Unistrut.

9. Substitutions: See Section 01 60 00 - Product Requirements.

B. Fuel Piping:
   1. Provide hangers and supports that comply with MSS SP-58 and ASME B31.9.
   2. If type of hanger or support for a particular situation is not indicated, select appropriate type using MSS SP-58 recommendations.
   3. Overhead Supports: Individual steel rod hangers attached to structure or to trapeze hangers.
   4. Multiple or Trapeze Hangers: Steel channels with welded supports or spacers and hanger rods.
   5. Hangers for Pipe Sizes 1/2 inch to 3 inches ([____] mm). Malleable iron, adjustable swivel, split ring.
   6. Use non-metallic coatings on attachments for electrolytic protection where attachments are in direct contact with copper tubing.

C. Hanger Fasteners: Attach hangers to structure using appropriate fasteners, as follows:
   1. Manufacturers:
      a. Powers Fasteners, Inc: www.powers.com/#sle.
      b. Substitutions: See Section 01 6000 - Product Requirements.

D. Hanger Rods: Mild steel, threaded both ends, threaded on one end, or continuous threaded.

2.05 BALL VALVES

A. Manufacturers:
   1. Apollo Valves: www.apollovalves.com/#sle.
   2. Contromatics: www.kfvalves.com.
   3. Nibco, Inc: www.nibco.com/#sle.
   4. Substitutions: See Section 01 6000 - Product Requirements.

B. Two-Piece, Full-Port, Bronze Ball Valves with Bronze Trim: MSS SP-110.
   1. [2 inch and Smaller ([_____] mm): Threaded brass ball valves with full port TFE sears and blowout proof stem, 600 psig WOG, AGA approved.
   2. Body: Bronze, complying with ASTM B584.
   3. Ball: Chrome-plated bronze.
   4. Stem: Bronze; blowout proof.
   5. Seats: Reinforced TFE; blowout proof.
   6. Packing: Threaded-body packnut design with adjustable-stem packing.
   7. Ends: Threaded, flared, or socket.
   8. CWP Rating: 600 psig.
   9. Listing: Valves NPS 1 and smaller shall be listed and labeled by an NRTL acceptable to authorities having jurisdiction.
   10. Service: Suitable for natural-gas service with "WOG" indicated on valve body.

2.06 PLUG VALVES

A. Cast Lubricated Plug Valves Inside Building:
   1. 2-inch and smaller: Cast iron body, threaded, equal to Nordstrom Valves, Inc. Figure 114.
   2. 2½ inch to 4-inch: Flanged cast iron body lubricated tapered plug type, 175 psig WOG, equal to Nordstrom Valves, Inc. Figure 115.
   3. 6 inch and larger: Flanged cast iron body lubricated tapered plug type, 200 psig WOG, worm gear operated, equal to Nordstrom Valves, Inc. Figure 165.
   4. Valves 2 ½ inch and larger shall be flanged.
   5. Provide 2 wrenches for each size used.
   6. Attach wrench to each valve.

2.07 GAS COCKS:

A. Gas cocks shall be for use only as manual gas shut-off valves at each piece of gas burning equipment; shall be of the plug type, bronze construction with check, nut and washer bottom and tee handle.
B. Gas cocks shall be Figure 10596 as manufactured by A.Y. McDonald Mfg. Co., or Series 52 as manufactured by Conbraco Industries, Inc.
C. Gas cocks shall only be used on piping 1 inch and smaller.

2.08 STRAINERS

A. Manufacturers:
   1. Mueller Steam Specialty.
   2. O.C. Keckley Company.
   3. Spirax Sparco, Inc.
   4. Substitutions: See Section 01 6000 - Product Requirements.
B. Size 2 inch (50 mm) and Under:
   1. Threaded brass or iron body for 175 psi (1200 kPa) CWP, Y pattern with 1/32 inch (0.8 mm) stainless steel perforated screen.
C. Size 2-1/2 inch (40 mm) to 4 inch (100 mm):
   1. Class 125, flanged iron body for 175 psi CWP, Y pattern with 3/64 inch (1.6 mm) stainless steel perforated screen.
D. Size 5 inch (125 mm) and Larger:
   1. Class 125, flanged iron body for 175 psi CWP, basket pattern with 1/8 inch (3.2 mm) stainless steel perforated screen.

2.09 PRESSURE REGULATORS

A. Manufacturers:
   1. Equimeter.
   2. American.
   3. Maxitrol.
   4. Sensus.
B. Product Description: Spring loaded, general purpose, self-operating service regulator including internal relief type diaphragm assembly and vent valve. Diaphragm case can be rotated 360 degrees in relation to body.
   1. Comply with ANSI Z21.80/CSA 6.22.
   2. Temperatures: Minus 20 degrees F to 150 degrees F.
   3. Body: Cast iron with neoprene gasket.
   4. Spring case, lowered diaphragm casing, union ring, seat ring and disk holder: Aluminum.
   5. Disk, Diaphragm, and O-Ring: Nitrile.
   6. Minimum Inlet Pressure: 5 psi.
   7. Furnish sizes 2 inches and smaller with threaded ends. Furnish sizes 2-1/2 inches and larger with flanged ends.
C. Incoming Service Pressure Regulators: Comply with ANSI Z21.80/CSA 6.22.
   1. Manufacturers:
      a. Equimeter.
      b. American.
      c. Maxitrol.
      d. Sensus.
   2. Body and Diaphragm Case: Cast iron or die-cast aluminum.
   3. Springs: Zinc-plated steel, interchangeable.
   4. Diaphragm Plate: Zinc-plated steel.

5. Seat Disc: Nitrile rubber resistant to gas impurities, abrasion, and deformation at the valve port.
6. Orifice: Aluminum; interchangeable.
7. Seal Plug: Ultraviolet-stabilized, mineral-filled nylon.
8. Single-port, self-contained regulator with orifice no larger than required at maximum pressure inlet, and no pressure sensing piping external to the regulator.
9. Pressure regulator shall maintain discharge pressure setting downstream, and not exceed 150 percent of design discharge pressure at shutoff.
10. Overpressure Protection Device: Factory mounted on pressure regulator.
11. Atmospheric Vent: Factory or field installed, stainless-steel screen in opening if not connected to vent piping.
12. Maximum Inlet Pressure: 60 psig.

2.10 INSERTS

A. Manufacturers:
   1. Anvil Fig. 281.
   2. PHD Fig 951.
   3. Michigan Hanger Model 355EG.
   4. Substitutions: See Section 01 60 00 - Product Requirements.
B. Inserts: Carbon steel case of galvanized steel shell and expander plug for threaded connection with lateral adjustment, top slot for reinforcing rods, lugs for attaching to forms; size inserts to suit threaded hanger rods.

2.11 FLASHING

A. Metal Flashing: 26 gage thick galvanized steel.
B. Metal Counterflashing: 22 gage thick galvanized steel.
C. Lead Flashing:
   1. Waterproofing: 5 lb./sq.ft. sheet lead
   2. Soundproofing: 1 lb./sq.ft. sheet lead.
D. Flexible Flashing: 1.85 inch thick sheet butyl; compatible with roofing.
E. Caps: Steel, 22 gage minimum; 16 gage at fire resistant elements.

2.12 FORMED STEEL CHANNEL

1. Unistrut Model Series P1000.
2. Superstrut Model Series 1200.
3. Michigan Hanger “O-Strut” Model A-12.
4. Substitutions: See Section 01 60 00 - Product Requirements.

B. Product Description: Galvanized 12 gage thick steel. With holes 1-1/2 inches on center.

PART 3 EXECUTION

3.01 PREPARATION

A. Ream pipe and tube ends. Remove burrs. Bevel plain end ferrous pipe.
B. Remove scale and dirt, on inside and outside, before assembly.
C. Prepare piping connections to equipment with flanges or unions.

3.02 INSTALLATION

A. Install in accordance with manufacturer's instructions.
B. Route piping in orderly manner and maintain gradient. Route parallel and perpendicular to walls.
C. Install piping to maintain headroom, conserve space, and not interfere with use of space.
D. Group piping whenever practical at common elevations.
E. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment.
F. Install valves with stems upright or horizontal, not inverted.

G. Sleeve pipes passing through partitions, walls and floors.
H. Pipe Hangers and Supports:
   1. Install in accordance with ASME B31.9 and MSS SP-89.
   2. Install hangers for horizontal steel piping with the following maximum spacing and minimum rod sizes:
      a. NPS 1 (DN 25) and Smaller: Maximum span, 96 inches (2438 mm); minimum rod size, 3/8 inch (10 mm).
      b. NPS 1-1/4 (DN 32): Maximum span, 108 inches (2743); minimum rod size, 3/8 inch (10 mm).
      c. NPS 1-1/2 and NPS 2 (DN 40 and DN 50): Maximum span, 10 feet (3 m); minimum rod size, 1/2 inch (13 mm).
   3. Install hangars for horizontal, corrugated stainless-steel tubing with the following maximum spacing and minimum rod sizes:
      a. NPS 3/8 (DN 10): Maximum span, 48 inches (1220 mm); minimum rod size, 3/8 inch (10 mm).
      b. NPS 1/2 (DN 15): Maximum span, 72 inches (1830 mm); minimum rod size, 3/8 inch (10 mm).
      c. NPS 3/4 (DN 20) and Larger: Maximum span, 96 inches (2440 mm); minimum rod, 3/8 inch, (10 MM).
      d. NPS 1 (DN 25) and Smaller: Maximum span, 96 inches (2438 mm); minimum rod size, 3/8 inch (10 mm).
   4. Place hangers within 12 inches (300 mm) of each horizontal elbow.
   5. Use hangers with 1-1/2 inch (40 mm) minimum vertical adjustment. Design hangers for pipe movement without disengagement of supported pipe.
   6. Where several pipes can be installed in parallel and at same elevation, provide multiple or trapeze hangers.
   7. Provide hangers adjacent to motor driven equipment with vibration isolation; refer to Section 23 0548.
   8. Support of pipe tubing and equipment is to be accomplished by means of engineered products specific to each application. Makeshift field devised methods will not be allowed.

3.03 APPLICATION

A. Install unions downstream of valves and at equipment or apparatus connections.
B. Install ball or gate valves for shut-off and to isolate equipment, part of systems, or vertical risers.
C. Provide plug valves in natural gas systems for shut-off service.

END OF SECTION

SECTION 23 3100
HVAC DUCTS AND CASINGS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Metal ductwork.
B. Kitchen hood ductwork.
C. Duct systems have been designed for metal duct.

1.02 RELATED REQUIREMENTS

A. Section 01 61 16 - Volatile Organic Compound (VOC) Content Restrictions.
B. Section 11 40 00 - Foodservice Equipment: Supply of kitchen range hoods for placement by this Section.
C. Section 23 05 48 - Vibration Isolation and Sound and Seismic Controls for HVAC Piping and Equipment.
D. Section 23 05 93 - Testing, Adjusting, and Balancing for HVAC.
E. Section 23 07 13 - Duct Insulation: External insulation and duct liner.
F. Section 23 33 00 - Air Duct Accessories.
G. Section 23 51 00 - Breechings, Chimneys, and Stacks.

1.03 REFERENCE STANDARDS

A. ASHRAE (FUND) - ASHRAE Handbook - Fundamentals; Most Recent Edition Cited by Referring Code or Reference Standard.
B. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2014.
C. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2017.
D. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2015.
E. ASTM A1008/A1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable; 2018.
F. ASTM A1011/A1011M - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength; 2018a.
G. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2018b.
H. NFPA 96 - Standard for Ventilation Control and Fire Protection of Commercial Cooking Operations; 2017.
I. SMACNA (DCS) - HVAC Duct Construction Standards Metal and Flexible; 2005 (Revised 2009).
J. SMACNA (KVS) - Kitchen Ventilation Systems and Food Service Equipment Fabrication and Installation Guidelines; 2001.
K. UL 181 - Standard for Factory-Made Air Ducts and Air Connectors; current edition, including all revisions.
L. UL 1978 - Grease Ducts; Current Edition, Including All Revisions.
M. UL 2221 - Tests of Fire Resistive Grease Duct Enclosure Assemblies; Current Edition, Including All Revisions.

1.04 COORDINATION

A. The Drawings do not attempt to show exact details of all ductwork. No extra payment will be allowed for obstruction by work of other trades or local obstructions to the work which require offsets. Where diagrams have been made to show duct connections, the Contractor is cautioned that these diagrams must not be used for obtaining material quantities.

B. Changes in location of equipment or ductwork, advisable in the opinion of the Contractor, shall be submitted to the Engineer for review before proceeding with the work. All measurements and dimensions shall be verified at the site.
C. Duct sizes shown on the Drawings represent the nominal free area required for that service. Where changes in duct dimensions are necessary to coordinate the installation, the contractor is allowed, with prior permission from the project engineer, to use alternative equivalent sized ducts.
D. Coordination with Existing Conditions and with other Trades:
   1. Coordinate the installation of ductwork with existing conditions and the work of other trades to allow the installation of ductwork and the proper operation of dampers and operators.
   2. Where existing thread rod, strut material, miscellaneous supports, conduit, or piping under 1-inch diameter obstructs the passage of the ductwork, they shall be relocated by the Contractor at no additional cost to the Owner. Coordinate the work with other trades.

1.05 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
B. Product Data: Provide data for duct materials, duct liner, duct connections, and duct fittings.
C. Manufacturer's Installation Instructions: Indicate special procedures for glass fiber ducts.
D. Manufacturer's Certificate: Certify that installation of glass fiber ductwork meet or exceed recommended fabrication and installation requirements.

1.06 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.
B. Installer Qualifications: Company specializing in performing the type of work specified in this section, with minimum three years of documented experience.

1.07 REGULATORY REQUIREMENTS

A. Construct ductwork to NFPA 90A, NFPA 90B, and NFPA 96 standards.

1.08 FIELD CONDITIONS

A. Do not install duct sealants when temperatures are less than those recommended by sealant manufacturers.
B. Maintain temperatures within acceptable range during and after installation of duct sealants.

PART 2 PRODUCTS

2.01 MATERIALS

A. Un-Galvanized Steel for Ducts: ASTM A 1008/A 1008M, Designation CS, cold-rolled commercial steel.
B. Stainless Steel for Ducts: ASTM A 666, Type 304.
C. Joint Sealers and Sealants: Non-hardening, water resistant, mildew and mold resistant.
   1. Type: Heavy mastic or liquid used alone or with tape, suitable for joint configuration and compatible with substrates, and recommended by manufacturer for pressure class of ducts.
   2. VOC Content: Not more than 250 g/L, excluding water.
   3. Surface Burning Characteristics: Flame spread of zero, smoke developed of zero, when tested in accordance with ASTM E84.
   4. For Use With Flexible Ducts: UL labeled.
   5. Manufacturers:
      a. Duro-Dyne; Model DSW: www.durodyne.com.
      b. Hard Cast; Model RTA 50: www.hardcast.com.
      c. Hard Cast; Model "Versa-Grip" 102: www.hardcast.com.
      d. Sika; Model "Sikaflex": www.sika.com.
      e. Substitutions: See Section 01 60 00 - Product Requirements.

D. Hanger Rod: ASTM A36/A36M; steel, galvanized; threaded both ends, threaded one end, or continuously threaded.
E. Hanger Fasteners: Attach hangers to structure using appropriate fasteners, as follows:
   1. Concrete Wedge Expansion Anchors: Complying with ICC-ES AC193.
   2. Masonry Wedge Expansion Anchors: Complying with ICC-ES AC01.
   3. Concrete Screw Type Anchors: Complying with ICC-ES AC193.
   4. Masonry Screw Type Anchors: Complying with ICC-ES AC106.
   5. Concrete Adhesive Type Anchors: Complying with ICC-ES AC308.
   6. Other Types: As required.
   7. Manufacturers:
      a. Powers Fasteners, Inc.: www.powers.com.
      b. Substitutions: See Section 01 60 00 - Product Requirements.
F. All Ducts: G90 Galvanized steel, unless otherwise indicated. Provide SMACNA pressure class as indicated or at a minimum meet or exceed the pressure rating of the connected fan. In no case less that 1/2 inch w.g. permitted.
G. Kitchen Cooking Hood Exhaust: 1 inch w.g. stainless steel or un-galvanized steel.
   1. Construct of 16 gage, 0.0598 inch sheet steel using continuous external welded joints in hidden rectangular sections.
   2. Construct of 18 gage, 0.0500 inch stainless steel using continuous external welded joints in exposed rectangular sections.
H. Grease Exhaust: 1.0 inch pressure class, stainless steel or un-galvanized steel.
   1. Construct of ASTM A1011/A1011M 16 gage un-galvanized steel in hidden areas.
   2. Construct of 18 gage, 0.0500 inch stainless steel in exposed areas.
   3. Construction:
      a. Liquid tight with continuous external weld for all seams and joints.
      b. Where ducts are not self draining back to equipment, provide low point drain pocket with copper drain pipe to sanitary sewer.
   4. Access Doors:
      a. Provide for duct cleaning inside horizontal duct at drain pockets, every 20 feet and at each change of direction.
      b. Use same material and thickness as duct with gaskets and sealants rated 1500 degrees F for grease tight construction.
I. Outside Air Intake: 1/2 inch w.g. pressure class, galvanized steel.

2.02 DUCTWORK FABRICATION

A. Fabricate and support in accordance with SMACNA (DCS) and as indicated.
B. No variation of duct configuration or size permitted except by written permission. Size round duct installed in place of rectangular ducts in accordance with ASHRAE (FUND) Handbook - Fundamentals.
C. Duct systems have been designed for metal duct.
D. Provide duct material, gages, reinforcing, and sealing for operating pressures indicated.
E. Construct T's, bends, and elbows with radius of not less than 1-1/2 times width of duct on centerline. Where not possible and where rectangular elbows must be used, provide air foil turning vanes of perforated metal with glass fiber insulation.
F. Provide turning vanes of perforated metal with glass fiber insulation when acoustical lining is indicated.
G. Increase duct sizes gradually, not exceeding 15 degrees divergence wherever possible; maximum 30 degrees divergence upstream of equipment and 45 degrees convergence downstream.

H. Fabricate continuously welded round and oval duct fittings in accordance with SMACNA (DCS).
I. Provide standard 45 degree lateral wye takeoffs unless otherwise indicated where 90 degree conical tee connections may be used.
J. Where ducts are connected to exterior wall louvers and duct outlet is smaller than louver frame, provide blank-out panels sealing louver area around duct. Use same material as duct, painted black on exterior side; seal to louver frame and duct.

2.03 DUCT MANUFACTURERS

A. Streimer Sheet Metal: www.streimer.com.
B. General Sheet Metal: www.gsmw.com.
C. Arctic Sheet Metal: www.arcticsheetmetal.com.
D. CoolSys Sheet Metal: www.coolsys.com.
E. Robert Lloyd Sheet Metal: www.rlsm.net.
F. Just Right Heating and Cooling: www.justrightheat.com.

2.04 ROUND AND FLAT OVAL SPIRAL SEAM DUCT

A. Manufacture: Machine made from round spiral lock seam duct in accordance with SMACNA (DCS).
B. Fittings: Manufacture at least two gages heavier metal than duct.
   1. All fittings shall have rolled edges for added strength and rigidity.
   2. All takeoffs to be completely separate fitting; direct tabs are not allowed. Saddle fittings are not allowed except for retrofit installations when approved by project engineer.
   3. Branch takeoffs are to be 45 degree laterals or conical tees, 90 and 45 degree.
   4. Elbows shall be radiused at 1.5 times the diameter. 15, 30 and 60 degree elbows shall be
      a. times the diameter.
   5. Joints are to be couplings with centering beads and double-lipped, U-profile EPDM rubber gasket. Use flange joints from 26 inch diameter and large. Crimped ends are prohibited except 8 inches and smaller.

2.05 RECTANGULAR HVAC DUCTWORK

A. Manufacture: Equal or exceed the minimum wall thickness and reinforcing as scheduled in the SMACNA rectangular duct construction schedule to comply with duct pressure classifications specified. Cross break or bead all duct widths over 14 inches and horizontal surfaces to prevent ballooning or breathing.
B. Fittings: Fabricate for easiest airflow.
   1. Branch tabs are to be 45 degrees entry with L = 1/4 W inches.
C. Joints:
   1. Longitudinal: Pittsburg lock flooded with mastic. Snaplock is not allowed.
   2. Traverse: Demountable joint such as Ductmate for 36 inch width and above. Seal corners prior to assembly.

2.06 MANUFACTURED DUCTWORK AND FITTINGS

A. Flexible Ducts: UL 181, Class 1, aluminum laminate and polyester film with latex adhesive supported by helically wound spring steel wire.
   1. Insulation: Fiberglass insulation with polyethylene or aluminized vapor barrier film.
   2. Pressure Rating: 10 inches WG positive and 1.0 inches WG negative.
   3. Maximum Velocity: 4000 fpm.
   4. Temperature Range: -20 degrees F to 210 degrees F.
   5. Minimum Insulation: R-6
   6. Manufacturers:
      a. Thermaflex, M-KE.
      b. Substitutions: See Section 01 60 00 - Product Requirements.

B. Grease Exhaust: Nominal 3 inches thick ceramic fiber insulation between 20 gage, 304 stainless steel liner and 24 gage, aluminized steel outer jacket.
   1. Tested and UL listed for use with commercial cooking equipment in accordance with NFPA 96.
   2. Certified for zero clearance to combustible material in accordance with:
      a. UL 2221 with a 2 hour rating.
   3. Materials and construction of the modular sections and accessories to be in accordance with the terms of the following listings:
      a. UL 1978.
      b. UL 2221.
   4. Manufacturers:
      a. AMPCO: www.ampcostacks.com.
      b. Selkirk: www.selkirkcommercial.com.
      c. CaptiveAire: www.captiveaire.com.
      d. Substitutions: See Section 01 60 00 - Product Requirements.

2.07 KITCHEN HOOD EXHAUST DUCTWORK

A. Fabricate in accordance with ductwork manufacturer's installation instructions, SMACNA (DCS), SMACNA (KVS), and NFPA 96.
B. Exhaust: Construct of 16 gage carbon steel or 18 gage stainless steel, using continuous external welded joints.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install, support, and seal ducts in accordance with SMACNA (DCS).
B. Install in accordance with manufacturer's instructions.
C. Flexible Ducts: Connect to metal ducts with adhesive and draw bands
D. Use sealant on all lapped round duct joint connections. Seal all ducts in accordance with State Energy Code.
E. Duct sizes indicated are inside clear dimensions. For lined ducts, maintain sizes inside lining.
F. Provide openings in ductwork where required to accommodate thermometers and controllers. Provide pilot tube openings where required for testing of systems, complete with metal can with spring device or screw to ensure against air leakage. Where openings are provided in insulated ductwork, install insulation material inside a metal ring.
G. Locate ducts with sufficient space around equipment to allow normal operating and maintenance activities.
H. Install duct hangers and supports in accordance with SMACNA HVAC Duct Construction Standards - Metal and Flexible.
I. Use double nuts and lock washers on threaded rod supports.
J. Connect diffusers to low pressure ducts with 5 feet maximum length of flexible duct held in place with strap or clamp.
K. At exterior wall louvers, seal duct to louver frame.

3.02 CLEANING

A. Clean duct system and force air at high velocity through duct to remove accumulated dust. To obtain sufficient air, clean half the system at a time. Protect equipment that could be harmed by excessive dirt with temporary filters, or bypass during cleaning.
B. Clean duct systems with high power vacuum machines. Protect equipment that could be harmed by excessive dirt with filters, or bypass during cleaning. Provide adequate access into ductwork for cleaning purposes.

END OF SECTION

SECTION 23 3300
AIR DUCT ACCESSORIES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Turning vanes.
B. Combination fire and smoke dampers.
C. Duct access doors.
D. Duct test holes.
E. Flexible duct connectors.
F. Volume control dampers.
G. Dampers.
H. Damper Operators:
    1. Electric Operators.

1.02 RELATED REQUIREMENTS

A. Section 23 0548 - VIBRATION ISOLATION AND SEISMIC CONTROLS FOR HVAC.
B. Section 23 3100 - HVAC Ducts and Casings.
C. Section 26 0583 - Wiring Connections: Electrical characteristics and wiring connections.

1.03 REFERENCE STANDARDS

A. AMCA 500-D - Laboratory Methods of Testing Dampers for Rating 2018.
B. NFPA 90A - Standard for the Installation of Air-Conditioning and Ventilating Systems 2021.
C. NFPA 96 - Standard for Ventilation Control and Fire Protection of Commercial Cooking Operations 2021.
D. SMACNA (DCS) - HVAC Duct Construction Standards Metal and Flexible 2021.

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements for submittal procedures.
B. Product Data: Provide for shop fabricated assemblies including volume control dampers, duct access doors, duct test holes, and hardware used. Include electrical characteristics and connection requirements.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.
B. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Protect dampers from damage to operating linkages and blades.

PART 2 PRODUCTS

2.01 TURNING VANES

A. Manufacturers:
    1. Elgen All-Tight.
    2. Duro-Dyne Type VR.
    3. Or approved equivalent.
B. Hat channel or embossed vane side rails with shop-fabricated, double-blade turning vanes of galvanized steel aligned in the short dimension. Individually adjustable.

2.02 DAMPERS

A. Manufacturers:
    1. Ruskin Company[<>]: www.ruskin.com/#sle.
    2. Greenheck; Model Series HAD/CAD: www.greenheck.com.
    3. Air Damper.
    4. Substitutions: See Section 01 6000 - Product Requirements.

B. Performance: Test in accordance with AMCA 500-D.
C. Frames: Galvanized steel, welded or riveted with corner reinforcement, minimum 12 gauge, 0.1046 inch.
D. Blades: Galvanized steel, maximum blade size 8 inches wide, 48 inches long, minimum 22 gauge, 0.0299 inch, attached to minimum 1/2 inch shafts with set screws.
E. Blade Deals: Synthetic elastomeric, inflatable, mechanically attached, field replaceable.
F. Jamb Seals: Spring stainless steel.
G. Shaft Bearings: Oil impregnanted sintered bronze.
H. Linkage Bearings: Oil impregnanted sintered bronze.
I. Leakage: Less than one percent based on approach velocity of 2000 fpm and 4 in-wc.
J. Maximum Pressure Differential: 6 in-wc.
K. Temperature Limits: Minus 40 to 200 degrees F.

2.03 DAMPER OPERATORS

A. General: Provide smooth proportional control with sufficient power for air velocities 20 percent greater than maximum design velocity and to provide tight seal against maximum system pressures. Provide spring return for two position control and for fail safe operation.
   1. Provide sufficient number of operators to achieve unrestricted movement throughout damper range.
   2. Provide one operator for maximum 36 sq ft damper section.
B. Electric Operators:
   1. Electric operators shall be manufactured by Belimo.
C. All actuators shall have an external gear release to allow manual positioning of the damper when the actuator is not powered. Spring-return actuators with more than 7Nm (60 in.-lb) torque capacity shall have a manual crank for this purpose.
D. Electric actuators for emergency damper control shall be rated for 350 degrees F maximum operating temperature and capable to drive fully open and close within 15 seconds.

2.04 DUCT ACCESS DOORS

A. Manufacturers:
   1. Cesco; Model Series HF: www.cescoproducts.com.
   2. Greenheck; Model Series HAD/CAD: www.greenheck.com.
   3. Ruskin Company: www.ruskin.com/#sle.
   4. Substitutions: See Section 01 6000 - Product Requirements.
B. Fabrication: Rigid and close-fitting of galvanized steel with sealing gaskets and quick fastening locking devices. For insulated ducts, install minimum 1 inch (25 mm) thick insulation with sheet metal cover.
   1. Less Than 12 inches (300 mm) Square: Secure with sash locks.
   2. Up to 18 inches (450 mm) Square: Provide two hinges and two sash locks.
   3. Up to 24 by 48 inches (600 by 1200 mm): Three hinges and two compression latches with outside and inside handles.
   4. Larger Sizes: Provide an additional hinge.
C. Access doors with sheet metal screw fasteners are not acceptable.

2.05 DUCT TEST HOLES

A. Temporary Test Holes: Cut or drill in ducts as required. Cap with neat patches, neoprene plugs, threaded plugs, or threaded or twist-on metal caps.
B. Permanent Test Holes: Factory fabricated, air tight flanged fittings with screw cap. Provide extended neck fittings to clear insulation.

2.06 FLEXIBLE DUCT CONNECTORS

A. Manufacturers:
   1. Ventfabrics Ventlon.

2. Duro-Dyne Durolon.
3. Carlisle HVAC Products; Dynair Connector Plus G90 Steel Offset Seam Neoprene Fabric: www.carlislehvac.com/#sle.
4. Elgen Manufacturing Company, Inc: www.elgenmfg.com/#sle.
5. Substitutions: See Section 01 6000 - Product Requirements.

B. Fabricate in accordance with SMACNA (DCS) and as indicated.

C. Flexible Duct Connections: Fabric crimped into metal edging strip.
1. Fabric: UL listed fire-retardant neoprene coated woven glass fiber fabric to NFPA 90A, minimum density 30 oz/sq yd (1.0 kg/sq m).
a. Net Fabric Width: Approximately 3 inches (75 mm) wide.
2. Metal: 3 inches (75 mm) wide, 24 gauge, 0.0239 inch (0.61 mm) thick galvanized steel.

D. Leaded Vinyl Sheet: Minimum 0.55 inch (14 mm) thick, 0.87 lbs per sq ft (4.2 kg/sq m), 10 dB attenuation in 10 to 10,000 Hz range.

E. Maximum Installed Length: 14 inch (356 mm).

2.07 VOLUME CONTROL DAMPERS

A. Manufacturers:
1. Cesco; Model Series MGF/MGG: www.cescoproducts.com.
2. Greenheck; Model Series MBD/MBDR: www.greenheck.com.
3. Nailor Industries, Inc; Model 1110/1120 galvanized: www.nailor.com/#sle.
4. Tamco: Series 1000 (aluminum): www.tamco.com.
5. Substitutions: See Section 01 6000 - Product Requirements.

B. Fabricate in accordance with SMACNA (DCS) and as indicated.

C. Splitter Dampers:
1. Material: Same gauge as duct to 24 inches (600 mm) size in either direction, and two gauges heavier for sizes over 24 inches (600 mm).
2. Blade: Fabricate of single thickness sheet metal to streamline shape, secured with continuous hinge or rod.
3. Operator: Minimum 1/4 inch (6 mm) diameter rod in self aligning, universal joint action, flanged bushing with set screw.
4. Manufacturers:
a. Krueger.
b. Substitutions: See Section 01 6000 - Product Requirements.

D. Single Blade Dampers:
1. Fabricate for duct sizes up to 6 by 30 inch (150 by 760 mm).
2. Blade: 24 gauge, 0.0239 inch (0.61 mm), minimum.
3. Manufacturers:
a. Greenheck MBD-10 or approved equal.
b. Substitutions: See Section 01 6000 - Product Requirements.

E. Multi-Blade Damper: Fabricate of opposed blade pattern with maximum blade sizes 8 by 72 inch (200 by 1825 mm). Assemble center and edge crimped blades in prime coated or galvanized channel frame with suitable hardware.
1. Blade: 18 gauge, 0.0478 inch (1.21 mm), minimum.
2. Manufacturers:
a. Greenheck MBD-15 or approved equal for 2-inch pressure.
b. Substitutions: See Section 01 6000 - Product Requirements.

F. End Bearings: Except in round ducts 12 inches (300 mm) and smaller, provide end bearings. On multiple blade dampers, provide oil-impregnated nylon, thermoplastic elastomer, or sintered bronze bearings.
1. Product: 515A.

2. Manufacturers:
   a. Young Regulator.
   b. Substitutions: See Section 01 6000 - Product Requirements.

G. Quadrants:
1. Provide locking, indicating quadrant regulators on single and multi-blade dampers.
2. On insulated ducts mount quadrant regulators on stand-off mounting brackets, bases, or adapters.
3. Where rod lengths exceed 30 inches (750 mm) provide regulator at both ends.
4. Manufacturers:
   a. 443 Valcalox Regulator manufactured by Young Regulator.
   b. Substitutions: See Section 01 6000 - Product Requirements.

PART 3 EXECUTION

3.01 PREPARATION

A. Verify that electric power is available and of the correct characteristics.

3.02 INSTALLATION

A. Install accessories in accordance with manufacturer's instructions, NFPA 90A, and follow SMACNA (DCS). See Section 23 3100 for duct construction and pressure class.
B. Provide dampers on exhaust fans or exhaust ducts or outside air ducts nearest to outside and where indicated.
C. Provide duct access doors for inspection and cleaning before and after filters, coils, fans, automatic dampers, at fire dampers, combination fire and smoke dampers, and elsewhere as indicated. Provide for cleaning kitchen exhaust ducts in accordance with NFPA 96 Provide minimum 8 by 8 inch (200 by 200 mm) size for hand access, size for shoulder access, and as indicated. Provide 4 by 4 inch (100 by 100 mm) for balancing dampers only. Review locations prior to fabrication.
D. Provide duct test holes where indicated and required for testing and balancing purposes.
E. At fans and motorized equipment associated with ducts, provide flexible duct connections immediately adjacent to the equipment.
F. At equipment supported by vibration isolators, provide flexible duct connections immediately adjacent to the equipment.
   1. See Section 23 0548.
G. Provide balancing dampers at points on supply, return, and exhaust systems where branches are taken from larger ducts as required for air balancing. Install minimum 2 duct widths from duct take-off.
H. Provide balancing dampers on duct take-off to diffusers, grilles, and registers, regardless of whether dampers are specified as part of the diffuser, grille, or register assembly.

END OF SECTION

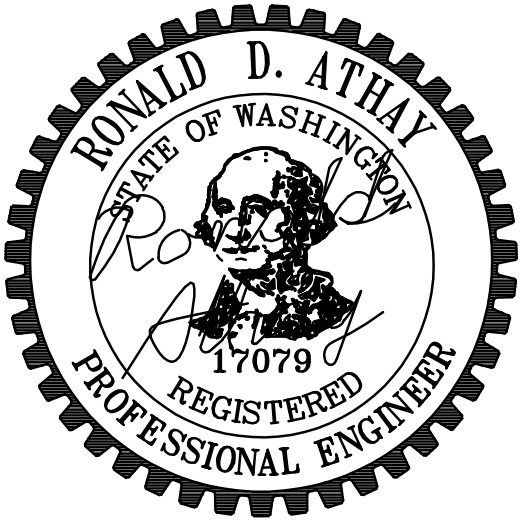
CITY OF LA CENTER
COMMUNITY CENTER KITCHEN REMODEL

COLLINS ARCHITECTURAL GROUP, P.S.
2022-09

July 20, 2022

ELECTRICAL SPECIFICATIONS

Prepared by:



EXPIRES APRIL 5, 2024

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ELECTRICAL SPECIFICATIONS

SECTION 26 0501

GENERAL PROVISIONS

PART 1 GENERAL

1.01 CONTRACT DOCUMENTS:

A. The General Conditions and General Requirements listed in Index to Specifications apply to the work of Division 26.

1.02 SCOPE:

A. Provide all labor, materials, equipment, transportation, and services necessary to supply, install, complete, adjust, make operable and balance systems indicated on Division 26 contract documents.

B. Review all contract documents for reference to work to be provided by Section 26. Include all such work in base bid.

C. Coordinate (convey) the electrical connection requirements as shown on the contract documents for the HVAC units with the mechanical contractor. Notify the architect in writing any proposed discrepancies for resolution prior to HVAC equipment purchase.

1.03 DRAWINGS:

A. Electrical Drawings: Drawings are diagrammatic, home runs may be regrouped or rerouted for a more economical installation if desired. Do not alter circuit functions or switching arrangements. The Architect reserves the right to make minor changes in the locations of equipment without additional charge provided such request is made prior to rough-in. (Plus or minus 6'-0".)

B. Architectural and Mechanical Drawings: Check Architectural Drawings to coordinate location of outlets and switches with cabinets or other requirements. Check Architecture for door swings. Locate switches on the lock side of doors. Locate outlets in or above back-splash above countertops. Before submitting his bid, the Contractor shall familiarize himself with the Architectural and Mechanical plans. Locations of equipment shown on those plans govern. Coordinate the installation of the electrical systems including (but not limited to) panels, disconnects, boxes, conduits, lights, and devices, so as to prevent space use conflicts.

C. Uncompleted Items: Outlets or equipment shown on the plans with no supply conductors or conduit indicated shall be completed as required.

D. Items not Understood or Omitted: Prior to bidding, refer to the Architect all items in the plans and/or specifications that are in conflict, not understood or incomplete so that addenda may be issued to make corrections or clarifications. Equipment shown on the plans or listed in the specifications shall be included as if called for on both.

1.04 SPECIFICATIONS:

A. Materials:

1. The specifications describe the quality of materials desired by written description and catalog number. Materials listed are those desired and shall be used unless written permission has been granted to use equal or better quality materials by other manufacturers.
2. Approval to use materials of other manufacturers shall in no way reduce the standards of quality set by the specifications. If materials installed do not meet the standards set by the specifications, they shall be removed and replaced with specified materials without additional cost to the Owner.

B. Installation: The specifications list the method of installation to be followed and types of materials to be used. The type of materials used shall fit the application. Materials improperly installed or of a type not suitable for the application shall be removed and replaced with suitable materials without additional cost to the Owner.

1.05 "AS BUILT" DRAWINGS:

A. Electrical Contractor shall provide to the Owner two red line drawing reflecting all deviations from original electrical design. Drafting shall be neat, readable and complete.

B. Permit approved drawings shall be turned over to the Owner at the completion of the project.

1.06 AS EQUAL SUBMITTALS:

A. Provide the Electrical Engineer and Architect each with one copy of CSI Substitution Request Form and one set of catalog cuts of the submittal equipment. Faxed submittals shall not be accepted. "Approved for bidding" does not constitute an unqualified approval of the product. All conditions of quality, function, size, safety, style and appearance shall be as specified.

1.07 APPROVAL OF SHOP DRAWINGS:

A. Approval of shop drawings does not remove the Contractor's requirements to comply with the intent of the Contract Documents. For shop drawing submittals that alter design conditions, electrical requirements, dimensions, functions, manufacturer, model, type, style, installation requirements, etc., it shall remain the responsibility of the Contractor to make all necessary adjustments, alterations, supply changes, trade coordination, etc., required to provide complete and operable systems. Any deviations from Contract Specifications shall be clearly noted in bold letters as such.

1.08 SUBMITTAL DATA:

A. Provide the Architect with one electronic file with brochures of catalog cuts or shop drawings of all items that are to be provided for the project. The file shall include a cover sheet indicating Project name, Architect, Engineer, and Contractor's name, address, telephone and fax numbers. Each brochure shall contain a complete set of all types of material to be provided under this Contract. Partial submittals will not be accepted and will be returned as disapproved. Make corrections and alterations as noted on returned drawings without additional charge where proposed materials do not conform to specifications or project requirements.

B. Submittals should include at a minimum the following (Plus any product that differs from specified product):

- Conduits and Fittings
- Conductors
- Outlets & Plates
- Switches & Plates and Dimmers
- Occupancy Sensors and lighting controls
- Disconnects
- Fuses
- Panelboards (With Shop Drawings)
- Circuit Breakers
- Lighting Fixtures, and Associated Control Equipment

1.09 TEMPORARY FACILITIES:

A. Provide temporary electrical power for construction purposes as outlined in Division 1. General Requirements, Section 01500, "Temporary Construction and Facilities". (Supplementary General Requirements.)

1.10 WORKMEN:

A. Employ a sufficient number of journeymen electricians and supervisors to insure orderly completion of the work.

1.11 INSPECTIONS AND TESTS:

A. All electrical work shall be inspected before concealment. Uncover work concealed and not inspected if so directed by jurisdiction having authority or Project Engineer.

B. Test all new feeders and branch circuits, etc., for shorts and grounds prior to energizing.

C. All systems shall be tested, adjusted and balanced for proper operation. The Owner and/or his official representative shall be instructed in their use and shown all controls and operating procedures. The operation of the systems shall be demonstrated in the presence of the Owner and Architect.

D. Provide the Owner with five (5) sets of all operating and maintenance manuals and instructions necessary to properly operate and maintain the systems.

E. Test all mechanical equipment connected to insure proper rotation and phasing.

F. Check the horsepower of all motors connected against the size of heater elements in the starters. If they do not match, notify the motor supplier to provide the correct size and type.

1.12 DEFINITIONS AND ABBREVIATIONS:

A. NEC: National Electrical Code.

B. EMT: Electrical Metallic Tubing.

C. WP: Weatherproof.

D. AWG : American Wire Gauge.

E. CONTRACTOR: In this Division of the Specifications refers to the Electrical Contractor.

F. FURNISH: Except as otherwise defined in greater detail, term "furnish" is used to mean supply and deliver to project site, ready for unloading, unpacking, assembly, installation, etc., as applicable in each instance.

G. INSTALL: Except as otherwise defined in greater detail, term "install" is used to describe operations at project site including unloading, unpacking, assembly, erection, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning and similar operations, as applicable in each instance.

H. PROVIDE: Except as otherwise defined in greater detail, the term "provide" means furnish and install, complete and ready for intended use, as applicable in each instance.

END OF SECTION

SECTION 26 0502

ELECTRICAL SYSTEMS SCHEDULE

PART 1 GENERAL

1.01 SYSTEMS INCLUDED UNDER THIS DIVISION:

A. Work includes but is not necessarily limited to the following outlined systems as well as the general wiring to the project.

1.02 BASE BID: Shall include the general wiring to the building and the following systems:

A. Secondary Distribution System Modifications

B. Power wiring to equipment provided in other Divisions of the Contract. Power connections shall be made under this Division.

C. General Wiring and Illumination System

D. Signal and Communications Systems:
   1. Refer to contract documents

E. Other Work as Indicated in the Contract Documents.

1.03 SYSTEMS NOT INCLUDED UNDER THIS DIVISION:

A. Low voltage wiring (less than 100 volts) associated with the functional control of heating and ventilating, air conditioning or water heating control or refrigeration controls, except as indicated on drawings.

END OF SECTION

SECTION 26 0503

CODES AND STANDARDS

PART 1 GENERAL

1.01 MATERIALS:

A. All materials shall be listed by the Underwriters Laboratory and bear the seal wherever standards of approval have been established and such service is normally provided by them. Adhere to all local requirements for materials approval.

1.02 UTILITY REQUIREMENTS:

A. Comply with all rules, regulations and requirements of the local serving utility and coordinate all service entrance and metering requirements with them before installation. Make all negotiations with the utility company and pay all connection charges or fees. If requirements are substantially different from those shown, notify the Architect so that corrective action can be taken.

1.03 PROJECT SITE:

A. Visit the project site and determine local conditions that affect this portion of the contract.

1.04 CODES AND REGULATIONS:

A. Install electrical work in strict conformance to the rules and regulations of legally constituted bodies having jurisdiction over the construction and use of the facility and the National Electrical Code latest edition.

1.05 PERMITS:

A. Arrange and pay for all permits and inspections of the work done. Work shall not be concealed until inspections have been made. Turn over certificates of inspections to the Architect.

1.06 WARRANTY:

A. The Contractor shall and hereby, does warrant that all materials (except specified otherwise) are new, free from defect, of current standard manufacture and design, of the quality, rating and type as shown or specified; and that any defect existing within the warranty period, due to improper or defective materials or workmanship, shall be corrected and resulting damage repaired without additional cost to the Owner.

1.07 WARRANTY PERIOD:

A. One (1) year after substantial completion and/or occupancy.

END OF SECTION

SECTION 26 0504
DEMOLITION

PART 1 GENERAL

1.01 GENERAL:

A. Existing devices and hardware shall not be removed unless called for removal on the contract drawings or as determined under on site examination and coordination, except abandoned conduit and wiring shall be removed. Refer to paragraph 3.1 for additional demolition coordination and work.

B. Provide cutting and patching of existing surfaces where required for electrical work. Patch and finish surfaces to match adjacent surfaces.

1.02 CONDITION OF EXISTING SYSTEMS:

A. Existing electrical systems are assumed functionally and operationally complete and working except as noted in Contract Documents. Notify Architect in writing of any discrepancy or malfunction prior to commencing on-site work. Commencement of on-site work shall constitute acceptance of existing systems as functionally and operationally complete and working except as prior noted.

PART 2 PRODUCTS

2.01 PRODUCTS USED:

A. Devices or hardware being replaced shall be as specified for new devices or, if not specified, of equal quality to hardware generally used in the existing area.

PART 3 EXECUTION

3.01 EXAMINATION:

A. All relocations, reconnections, and removals are not necessarily indicated on Drawings. Examine the project site and verify the scope of demolition work and include all such work in the base bid.

3.02 REMAINING HARDWARE:

A. Unless specifically indicated to be removed either by note or symbol, all devices or hardware shown as existing shall remain in place and in service, except abandoned wires shall be removed.

3.03 MAINTAINING CONTINUITY:

A. Where a device or hardware is indicated to be removed, and device(s) which are to remain are fed through this device or hardware, the feed to these devices to remain shall be maintained. Extend raceways or provide a new feed as required.

3.04 REPAIR OF DAMAGE:

A. If, in the course of demolition, a device, hardware, building portion, or line of service (i.e. electrical branch circuit or feeder) required to remain is damaged, the Contractor shall repair the damage or replace with new material to restore the original condition or provide a better condition.

3.05 EXTENSION OF FEEDERS:

A. All existing branch circuits which are in or pass through the work area which are to remain shall be relocated and/or extended as required to maintain service from the panelboard they are served from. Some existing branch circuits may not be indicated on Drawings. Verify requirements on project site prior to bid.

3.06 DISPOSAL OF PCB CONTAMINATED ELECTRICAL EQUIPMENT:

A. Dispose of PCB contaminated electrical equipment in a manner in compliance with applicable national, state, and local codes. Provide proof of incineration of PCB contaminated ballasts to the owner

3.07 DISPOSAL OF FLUORESCENT AND H.I.D. LAMPS:

A. Dispose of fluorescent and H.I.D. lamps in a manner in compliance with applicable national, state, and local codes. Provide written proof of proper disposal to the owner.

END OF SECTION

SECTION 26 0520

BASIC MATERIALS AND METHODS

PART 1 GENERAL

1.01 GENERAL:

A. Materials listed set type and quality standards for the project. Materials listed are those desired. Materials approved as "equal" shall not change quality or intent of Contract Documents. If "approved" materials are not found equal to specified items upon visual inspection or test, they shall be removed and replaced with specified materials without additional cost. Sole decision as to "as equal" acceptability shall reside with the Engineer.

1.02 MATERIALS IDENTIFIED:

A. All materials shall be new, of current standard manufacture and design, and U.L. listed for intended application.

1.03 MATERIALS NOT LISTED:

A. Provide all items such as relays, control transformers, signal transformers, etc., that are necessarily part of the finished system and required for logical functioning of the system.

1.04 UNAPPROVED MATERIALS:

A. Remove and replace with specified materials if directed by Architect, without additional cost to Owner.

1.05 WORKMANSHIP:

A. Shall be best standards of industry and shall conform to specification methods. Un-workman-like work shall be removed and replaced at no additional cost.

1.06 COORDINATION OF WORK:

A. Coordination with plumbing lines, heating and ventilating duct work, etc., to eliminate space use conflicts.

PART 2 PRODUCTS

2.01 CONDUITS: All wiring shall be in conduit or approved McCable.

A. Rigid Metal Conduit: Hot dipped galvanized steel. General Electric, Republic, U.S. Steel, National or equal.

B. Electrical Metallic Tubing: Seamless, sheradized or hot dipped galvanized steel.

C. Rigid Plastic Conduit: (PVC) Polyvinylchloride. UL approved. Baldwin, Corlon or approved equal. For underground use only. Use only where code allows.

D. Flexible Metallic Conduits: Shall contain separate grounding conductor, galvanized steel armour. Maximum length 72". Not approved for general wiring.
   1. Dry Locations: Columbia, Triangle or equal.
   2. Wet Locations or Exposed to Weather: Liquid tight, neoprene or vinyl jacket. Anaconda Sealtite, Type UA or equal.

E. "MC" type cable:
   1. Approved only for 20 and 30 amp branch circuits where allowed by code.
   2. Galvanized steel armour.
   3. Insulated green ground conductor, minimum size #12 AWG.
   4. Final home runs shall be EMT and separate conductor in Common Areas.
   5. Manufacture: AFC Cable System, Inc., Type MC.

F. Non-metallic Sheath Cable: Not approved

G. Fittings:
   1. Rigid Conduits:
      a) Bushings - Insulating type with grounding lugs where required.
   2. EMT and Flexible Conduit: Fittings - All steel set screw type, pre-insulated. Fittings with die cast aluminum or pot metal components are not acceptable. Steel City or approved substitution.

2.02 CONDUCTORS:

A. Copper: Solid #12 AWG minimum size up to #10 AWG. Stranded for sizes #8 and larger. Fire alarm and signal circuits to be stranded.

B. Aluminum: Minimum size #1 AWG, stranded. Where substituted for copper shall have equivalent ampacity and voltage drop. Resize conduits as required. ALCAN Stabiloy XHHW Alloy AA-8030, or Southwire XHHW Alloy #AA-8178 only.

C. Insulation:
   1. General: Type THWN, THHN, XHHW.
   2. Recessed Fixtures, baseboard heaters or other high ambient temperature locations. Type THHN.
   3. Aluminum: XHHW.

2.03 OUTLET BOXES:

A. Steel, as best suited for the job intended. 4 inch square by 1-1/2 inches or more deep for general use. Device covers shall match finish to be applied to walls. For concrete block use square shouldered device covers so that box can fit into block cavity. Steel City, RACO or approved substitution.

B. Outlet boxes supporting ceiling fans shall be UL approved for this application typical.

2.04 PULL AND JUNCTION BOXES:

A. General Use: Steel, with baked enamel finish and screw covers. NEMA 1 enclosures. Alwalt or approved substitution.

B. Exterior Use: Cast aluminum with threaded conduit hubs and water tight screw covers.

C. Installation:
1. Junction boxes and pull boxes shall be installed so that they are accessible at all times. The Contractor shall be required to provide sufficient pull boxes to conform to Code requirements whether shown or not. If a box is required in inaccessible place, provide access panel.

2.05 SWITCHES AND RECEPTACLES:

A. Switches and receptacles shall all be of the same manufacture, style and type.

B. Switches: 20 ampere, 120/277 volt, mechanically quiet type, white handle. Specification grade. Federal Spec. #W-S-896d.

Manufacture	SPST	3 Way
Hubbell	CS1221-W	CS1223-W
P & S	20AC-1-W	20AC-3-W
AH	1991-W	1993-W
Leviton	1221-2-W	1223-2-W

C. Receptacles:
1. Duplex Convenience Outlets: 15 ampere, 120 volt, 2 wire with U-slot ground. White. Shall be of same manufacture as switches. Reference Hubbell #CR5252-W. 20 ampere, 120 volt where noted Reference Hubbell CR5352-W. Provide 20 amp receptacle on all dedicated circuit receptacles.
2. Provide GFIC type receptacle where shown on drawings or required by NEC or UBC. "Feed through" protection not allowed. Reference Hubbell GF5262-W.
3. Specialized Outlets: As indicated on Drawings.

D. Keyed Switches: Arrow Hart #AH1191NOF, Leviton #1221-2KL.

E. Wall Dimmer Switch: Refer to lighting drawing.

F. Occupancy Sensors: Refer to lighting drawing.

G. Trim:
1. General: Single piece stainless steel in all areas. Non-magnetic chrome-nickel alloy #302 in kitchens, toilets and on brick or masonry walls. Type #430 for standard use.
2. Weatherproof: Hubbell #WP26M (horizontal #WP26MH) (cast aluminum).
3. Use standard sizes in all locations except on masonry or block walls. Use Type SO plates.

2.07 SAFETY SWITCHES:

A. Horsepower dual rated, type heavy duty non-fusible for general use. Provide with compression lugs where connecting aluminum conductors. General use NEMA 1. Exterior use rain tight NEMA 3R. Provide fusible disconnect switches where indicated or specified. Fusible safety switches shall incorporate factory installed rejection clips for use with Class "RK1" and "RK5" fuses. Switch doors shall be interlocked with handle to prevent opening when switch handle is in the "on" position. Identify all disconnects with permanent lamicoid label indicating load (equipment) served. 3/8" minimum letter height.

2.08 FUSES:

A. Motor circuits, U.L. Class "RK5" time delay. Non-motor circuits U.L. Class "RK1". Gould-Shawmut, Bussman, Economy, Littelfuse or as approved. Provide one spare set for each size and class supplied.

2.09 SINGLE PHASE MOTOR DISCONNECTS:

A. Provide manual motor starting switches with melting alloy type thermal overload relay protection for all fractional horsepower, single phase motors.

2.10 SHUNT TRIP CONTROL STATION:

A. Provide an emergency power off pushbutton. Pushbutton shall be push off, pull on maintained contact. Provide with guard to prevent accidental operation. Pushbutton shall be heavy duty, oil tight with red head. Provide permanent engraved label “POWER OFF”. Allen-Bradley #800T-1TZ enclosure with Allen-Bradley #800T-XA contact block with Allen-Bradley #800T-N310 push/pull button ring.

2.11 SUPPORTING DEVICES:

A. Conduits:
   1. Single: Securely support raceway within 3 feet of every 90 degree bend, outlet box, junction box, device box, cabinet, conduit body, and other termination with approved straps, clamps, or hangers. Space supports every 10 feet maximum. Securely mount raceway supports, boxes, and cabinets in an approved manner by:
      a) Expansion shields in concrete or solid masonry.
      b) Toggle bolts on hollow masonry units.
      c) Wood screws on wood.
      d) Metal screws on metal.

   2. Multiple: Kindorf Channels with approved conduit straps or clips. Spaced 10'-0" on centers.

B. Kindorf Channel installed exposed to the weather (any exterior use) shall be galvanized.

2.12 FIRE BARRIER MOLDABLE PUTTY:

A. U.L. listed, 3M Brand fire barrier moldable putty Type MPS or MPP.

PART 3 EXECUTION

3.01 MOUNTING HEIGHTS:

A. Devices shall be as follows unless indicated otherwise by specified note on the drawings. Devices shall be located above or below top of wainscoting, adjacent to tackboards or bulletin boards and shall not cut through metal trim or be located in tackboards. Coordinate with Architectural Drawings prior to rough-in. Verify all heights prior to rough-in.

Control switches for lights, fan, etc.	45" to center line

Convenience outlets: Wall mount over counter	refer to drawings
Telephone and intercommunications	
wall mount - desks	18" to center line
wall hung handset	45" to center line
Panelboards (to top of trim)	6'-6"

3.02 RACEWAYS AND CONDUITS:

A. Routing: Run concealed except where detailed as exposed or where surface metal raceways are specified; or by written permission where it is difficult or impractical to conceal.

B. Outlet and Switch Box Placement:
   1. In stud walls back-to-back boxes are not allowed. Separate boxes in adjacent rooms by a minimum of one stud.
   2. Outlet and Switch Box Placement: Provide box extensions as required to bring metallic box flush with final wall surface.

C. Materials: All conduits above grade shall be metal unless indicated otherwise. Size non-metallic conduits to accommodate grounding conductors. Sizes shown on the drawings are for metal conduits unless shown otherwise.

D. Minimum Sizes:
   1. Power: 1/2 inch.
   2. Lighting: Home Runs - 3/4 inch. Switch legs and runs between outlets 1/2 inch.

E. Usage:
   1. Electrical Metallic Tubing: Use where exposed on ceilings, above suspended ceilings, in attics, hollow cavity walls or cavities of block walls. Not approved for burial, exterior areas, or casting in concrete. Maximum size two (2) inches. Conduit in hollow cavity of block walls being filled with concrete shall be rigid steel instead of EMT.
   2. Rigid Galvanized Steel Conduits: Use where raceways are cast into concrete, solid masonry, exposed on walls, exposed to weather or in hazardous areas requiring liquid tight, dust tight or explosion proof wiring.
   3. Flexible Metallic Conduits: Use to connect electrical apparatus subject to vibration, such as motors, fans, etc., and to connect recessed lighting fixtures in suspended ceiling installations. Maximum length 72". Not approved for general wiring.
   4. Surface metal raceways may be used only where specified or by prior approval for remodel work where it is not practical to conceal wiring.
   5. PVC Conduit: Where code use permits, raceways buried directly in the earth may be rigid Sch. 40 polyvinylchloride (PVC) sized to accommodate grounding conductors. Elbows shall be rigid steel conduit wrapped with Scotch #51 tape.
   6. MC Cable: Where code use permits, approved for 20 amp branch circuits. Home runs shall be EMT and copper conductors in Common Areas.

F. Installation:
   1. Cut ends of all conduits square and ream. Make all joints water tight. Fittings shall be compatible with conduit used, secured water tight, and form a smooth transition from

conduit to fitting. Make all bends with no flattening or wrinkling with a bender designed for use with the conduit used.

2. Run in neat rows with smooth uniform bends. Support multiple runs from Unistrut hangers in all exposed areas, spaces above ceilings or risers. Diagonal, crossed or haphazard, non-supported runs will not be allowed.
3. All conduit penetrations of fire rated walls, ceilings or floors shall be sealed with specified fire barrier putty. The amount of caulking shall be in relation to the rating of the surface being penetrated. Comply with requirements of the Product Manufacturer and local codes. Maintain rating of penetrated item.
4. Sealing of Conduit Penetrations: Seal around conduit penetrations through walls or floors between conditioned (heated) and unconditioned spaces.

3.03 WIRES AND CABLES:

A. Marking and Coding:
   1. Wiring shall be color coded to conform to standard practices of the industry.
   2. 120/240 volt system shall be solid colors with white neutral.
      A-Phase - Black
      B-Phase - Red
   3. All control wiring shall be labeled and tagged with each conductor identified.
   4. Power feeders using all black insulating wiring shall have phase identified with colored vinyl tape at all terminations and splices.
   5. Identify all feeder or branch circuit loads in the same panelboards.

B. Insulation Value:
   1. All wire contained in the same raceway shall have an insulation value to match the highest voltage between conductors of all circuits contained therein.

C. Products:
   1. Pulling: Use pulling compounds as recommended by the wire manufacturer; do not exceed recommended pulling tensions; leave sufficient pigtails at each j-box or cabinet for make up.
   2. Aluminum Conductors: All splices, terminations or connections shall be made with compatible fittings and non-oxide conductive paste.

END OF SECTION

SECTION 26 0526
GROUNDING

PART 1 GENERAL

1.01 GENERAL:

A. General Conditions and General Requirements as listed in Index to Specifications apply to work under this Section.

B. Provide a complete grounding system as shown and as required by the NEC and the local enforcing authority with common grounding point at the main distribution center.

PART 2 PRODUCTS

2.01 CONDUCTORS:

A. Main System Ground: Bare stranded copper per N.E.C. (Existing – Verify)

B. Bonding Jumpers: Copper minimum size #2 in switchboards and switchboard rooms.

C. Bonding Conductors, Equipment: Copper per NEC requirements. Green insulation.

2.02 GROUND CLAMP:

A. Code approved.

PART 3 EXECUTION

3.01 INSTALLATION:

A. The cold water system shall be used as the main system ground. Bond to a minimum size 2 inch metal cold water pipe, 20 feet of which must be in contact with the earth. (Existing – Verify).

B. Provide 2- 10 foot long ground rods, 10 feet apart. Bond to System Ground. (Existing – Verify).

END OF SECTION

SECTION 26 2417

SERVICE AND DISTRIBUTION

PART 1 GENERAL

1.01 GENERAL:

A. General Conditions and General Requirements as listed in Index to Specifications apply to work under this Section.

1.02 WORK DIVISION:

A. Utility Company: Provision, installation, connection and energization of all primary cables, pad mounted transformer (existing) and meter (existing).

B. Electrical Contractor: Provision, installation, connection and energization of all new systems. Refer to the drawings.

PART 2 PRODUCTS

2.01 CONDUITS:

A. Underground Feeder: Schedule 40 PVC with long sweep rigid steel elbows wrapped with Scotch #51 tape. Verify requirements on contract documents.

B. Above Grade Feeders: Rigid galvanized steel or EMT. Refer to Section 25 0520 for conduit usage.

2.02 CONDUCTORS:

A. Feeders: Stranded copper sized as shown on the drawings.

2.03 LOADCENTERS:

A. Cabinets: Code gauge galvanized or pickled steel with factory finish of baked enamel or lacquer. For surface or flush mounting as shown. Dead front safety type. Hinged doors with keyed alike locks, with lift latch for opening. Boxes shall be 3-3/4 inches deep by 14 inches wide by length as required.

B. Bus Work: Hard drawn copper for all panelboards. Wire terminals shall be compression type with non-oxide conductive paste for accepting aluminum conductors.

C. Future Provision: Where "space" or provision is called for, provide all necessary hardware so the spare is ready to accept circuit breaker (or switch as applicable) without additional hardware.

D. Circuit Breakers: Common trip, single handle. Minimum AIC ratings shall be 10,000 amperes at 240 volts.
   1. General Use: Molded case, thermal magnetic, bolted to bus, amperage and poles as indicated in Panel Schedules.

2. Ground Fault Circuit Interrupter Type: Provide for exterior building outlets, wet location outlets, hazardous locations, and for all circuits where indicated; and in addition, where required by UBC, OSHA or NEC.
3. HACR Type Circuit Breakers: Provide HACR rated circuit breakers on all heat pump and air conditioner branch circuits.
4. Appliance Circuit Lock-offs: Provide padlock lockable circuit breaker handle lock-offs for all circuits serving permanently installed appliances over 300VA or 1/8 hp per NEC 422-21.
5. Shunt-trip circuit breakers. Provide where indicated and provide control circuitry complete.

E. Panelboard Types:
1. 225 amperes or less: Square D Q (250V), or equal.

F. Labeling: Label all circuits showing load served in Panelboard Schedule. Typewritten only. Panel Schedules shall reflect final room names, not names shown on plans. Provide permanent lamicoid label on Panel.

G. Manufacture: SD. D., G.E., Cutler-Hammer/Westinghouse, Siemens. Mount loadcenters with top up 6'-6" and anchor securely to building structure.

PART 3 EXECUTION

3.01 BRANCH CIRCUIT:

A. All branch circuits shall be run concealed where possible.

B. In general, branch circuits shall contain two phases and a neutral for 120/240 volt, single phase, three wire systems. Branch circuits shall be on opposite phases to balance neutral loads.

C. Home runs shall conform to the following:
1. 120/240 volt circuits where load is more than 1000 watts and run is more than 50 feet, minimum wire size shall be #10 AWG copper.

D. Extend the branch circuit from the panelboard to the disconnect, mount the starter and wire through to the final connection of the apparatus to be connected.

3.04 LOW VOLTAGE CABLES (70 Volts or Less):

A. In inaccessible, concealed spaces run cables in raceway. In accessible, unfinished areas cables may be run exposed without raceway.

B. Run exposed cables parallel to or at right angles to building structure lines. Do not run exposed cables on floors or in such a way that they obstruct access to, operation of, or servicing of equipment. Keep cables 6 inches minimum from hot water pipes.

C: Support cables every 3 feet with permanent clips, straps, staples, or tie wraps approved for application and which will not cause cables to be pinched or deformed.

D. Securely attach clips and straps with nails or screws. Do not use wire or tape to support cables.

E. Bundle only cables of same systems together.

3.05 CONTROL WIRING:

A. Provide all control wiring associated with equipment or systems provided and included as part of this Division. Unless specifically indicated, control wiring associated with the function and control of heating, ventilating, exhaust, hydronic pumping, water heating equipment or operation of dampers or similar is not covered under this Division.

3.06 RECEPTACLES:

A. Provide the correct type and style of receptacle for phase and voltage of device to be plugged in.

3.07 EQUIPMENT PROVIDED BY OTHERS:

A. It shall be the responsibility of the Electrical Contractor to verify nameplate data on all Mechanical Equipment prior to rough-in. Where direct connection is to be made to equipment, provide code disconnect as required. Provide all disconnects as indicated on drawings.
   1. Provide fusible disconnects for refrigeration and/or air conditioning compressor motors, motors without overload protection, and as specified or shown on the drawings.
   2. Provide non-fuse disconnects for motors having overload protection, equipment not in site of panelboards, or as required otherwise by code authority.
   3. Starters shall be furnished by others and installed under Division 16 work unless specified otherwise.

END OF SECTION

SECTION 26 5100

LIGHTING FIXTURES

PART 1 GENERAL

1.01 GENERAL:

A. General Conditions and General Requirements as listed in Index to Specifications apply to work under this Section.

B. Provide new lighting fixtures typical in each location of type indicated. Provide with new lamps of wattage as shown. Letter designates fixture type. UL approved.

PART 2 PRODUCTS

2.01 BALLASTS (DRIVERS):

A. Voltage: All ballasts shall be 120 volts for both interior and exterior lighting fixtures unless noted otherwise.

B. LED: As provided with specified fixtures

C. Execution: Factory installed in lighting fixtures where possible. All ballasts shall be easily accessible for service and maintenance.

2.02 LAMPS:

A. LED: As provided with specified fixtures.

2.03 LIGHTING FIXTURE SCHEDULE:

Refer to drawings.

PART 3 EXECUTION

3.01 INSTALLATION:

A. Fixtures run in continuous rows shall be mounted at a uniform height unless shown otherwise. Align both horizontally and vertically.

B. Surface mounted fixtures shall be anchored to or supported from outlined members or from bridging between structural members as outlined above. Anchors shall conform to specified types found in other sections of this Specification. Provide ceiling spacers as required.

C. All anchors shall support the weight of the fixture plus 150 lbs.

D. The surfaces of all fixtures and lenses, interior and exterior, shall be wiped free of construction dust at the completion of the project.

END OF SECTION